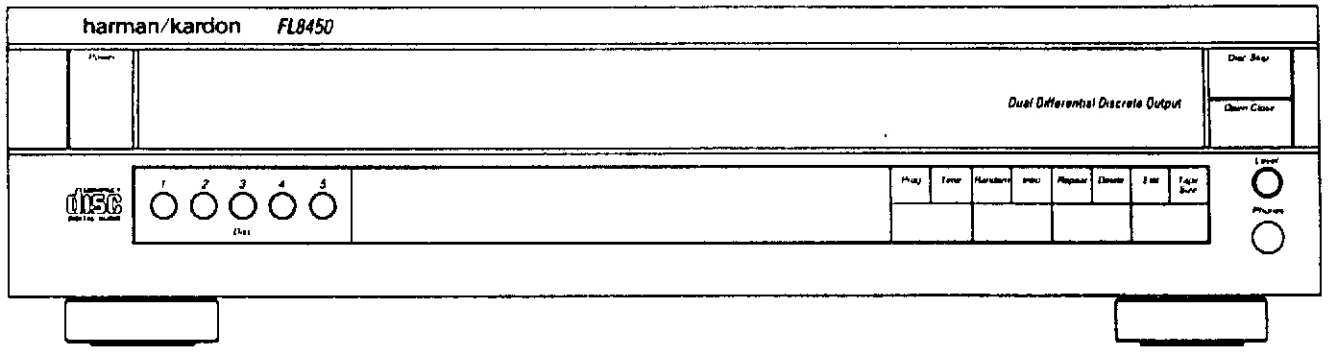
The Harman Kardon
Model FL8450
COMPACT DISC CHANGER

Manual A

Technical Manual



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DANGER: Invisible laser radiation when open and interlock failed or defeated.
AVOID DIRECT EXPOSURE TO BEAM.

harman/kardon

Parts and Service Office
80 Crossways Park West, Woodbury, N.Y. 11797
1112-FL8450A P9502 1500 Printed in Korea

LASER BEAM SAFETY PRECAUTIONS

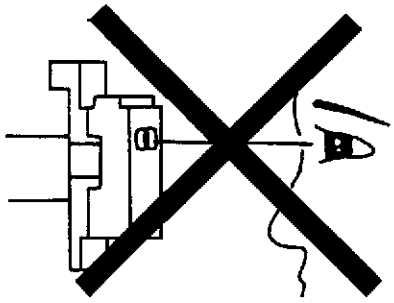
CLASS 1 LASER PRODUCT

CLASS 1
LASER PRODUCT

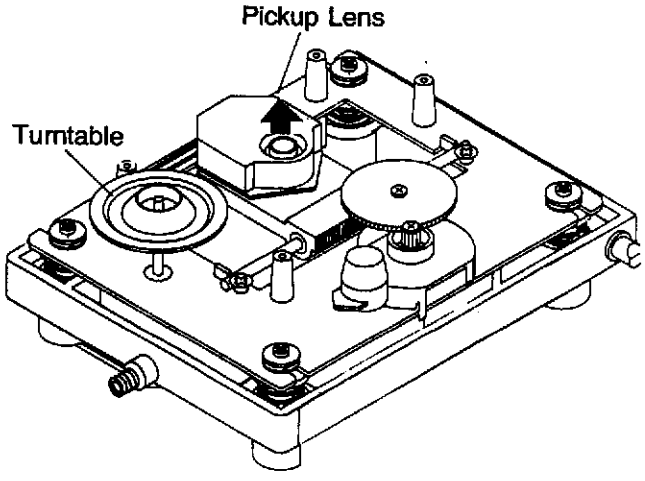
CAUTION
Invisible laser radiation when the unit is open. DO not stare into beam.

CAUTION: USE OF ANY CONTROLS, ADJUSTMENT, OR PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

Do not look directly at the laser beam coming from the pickup or allow it to strike against your skin.



This compact disc player uses a pickup that emits a laser beam. The laser beam is emitted from the location shown in the figure. When checking the laser diode, be sure to keep your eyes at least 1 foot away from the pickup lens when the diode is turned on. Do not look directly at the laser beam.



CAUTION:
Using controls and adjustment, or doing procedures other than those specified herein, may result in hazardous radiation exposure.

SAFETY PRECAUTIONS

CAUTION

RISK OF ELECTRIC SHOCK.
DO NOT OPEN.

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Caution: To prevent electric shock do not use this (polarized) plug with an extension cord, receptacle or other outlet unless the blades can be fully inserted to prevent blade exposure.

Attention: Pour prévenir les chocs électriques ne pas utiliser cetre fiche polarisée avec un prolongateur, une prise de courant ou une autre sortie de courant, sauf si les lames prévent étre insérées à fond sans en laisser aucune partie à découvert.

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

HANDLING LASER PICKUP

The laser diode in the optical system of this player can be damaged by electrostatic discharge from your clothes or your body. Proper electrostatic grounding for service personal is required during servicing.

BEFORE REPAIRING THE COMPACT DISC PLAYER

Preparation

- Human Body Grounding:
  Many of the components used in this compact disc player, including the laser pickup, are sensitive to electrostatic discharge. Service personal should be grounded with an electrostatic armband (1 Mohm).

- Caution:
  Static charge on clothing does not escape through a body grounding wrist band.
  Be careful not to contact the pickup or electrical components with your clothing.

- Workbench and Tool Grounding:
  A properly-grounded electroconductive plate (1 Mohm) or metal sheet should be fitted to the workbench surface. Tools and instruments (such as soldering irons and scopes) should be grounded to prevent AC leakage.

Figure 1

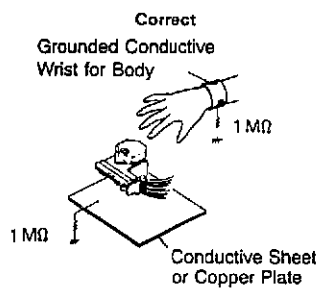


Figure 2

Note: Laser diodes are so susceptible to damage from static electricity that, even if a static discharge does not ruin a diode, it can shorten its life or cause it to work improperly.

LEAKAGE TEST

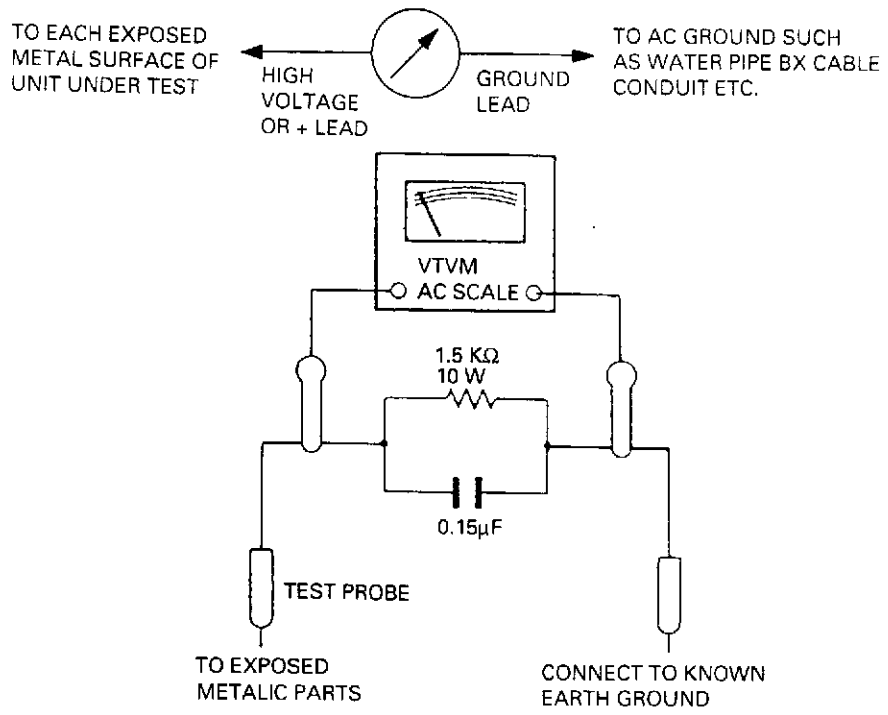
Before returning the unit to the user, perform the following safety checks:

1. Inspect all lead dress to makes certain that leads are not pinched or that hardware is not lodged between the chassis and other metallic parts in the unit.
2. Be sure that any protective devices such as nonmetallic control knobs, insulating fishpapers, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacity networks, mechanical insulators, etc. Which were removed for servicing are properly reinstalled.
3. Be sure that no shock hazard exists; check for leakage current using Simpson Model 229 Leakage Tester, standard equipment item no. 21641, RCA model WT540A or use alternate method as follows: plug the power cord directly into a 120-volt AC receptacle (do not use an Isolation transformer for this test).

Using two clip leads, connects a 1500 ohm, 10-watt resistor paralleled by a 0.15μF capacitor, in series with all exposed metal cabinet parts and a known earth ground, such as a water pipe or conduit. Use a VTVM or VOM with 1000 ohms per volt, or higher sensitivity to measure the AC voltage drop across the resistor. (see diagram) Move the resistor connection to each exposed metal part having a return path to the chassis (antenna, metal cabinet, screw heads, knobs and control shafts, escutcheon, etc.) and measure the AC voltage drop across the resistor. (This test should be performed with the power switch in both the on and off positions.)

A reading of 0.35 volt RMS or more is excessive and indicates a potential shock hazard which must be corrected before returning the unit to the owner.

SIMPSON MODEL 229 ETC. FOR LEAKAGE TEST



SPECIFICATIONS

General

Transmission bit rate ····· 4.3218 Mbit/sec
Transmission on clock ····· 16.9344 MHz
Error correction ····· CIRC C1, C2 double correction

Pickup

System object lens drive type ····· Optical pickup
Object lens drive system ····· 2 dimensional parallel drive system
Optical source ····· Semiconductor AlGaAs laser
Wave length ····· 760-800 nm
Tracking system ····· 3 beam tracking servo type

Others

Digital filter ····· 8 times oversampling type
Analog filter ····· 2 pole RC type
D/A converter ····· 1 bit twin with digital filter.
Power consumption ····· 12 W
Dimensions (HWD) ····· 3.7 × 17.3 × 14.9 inches
95 × 440 × 380 mm
Weight (net) ····· 6.5 kg (14 lbs 5 oz)

Electrical

Test Item	Unit	Nominal	Limit
Output voltage at 1 kHz	V	2.0	2.0±0.2
Distortion and noiser without filter:			
20Hz	%	0.007	0.01
1 kHz	%	0.007	0.01
10 kHz	%	0.01	0.02
16 kHz	%	0.008	0.01
18 kHz	%	0.008	0.01
20 kHz	%	0.008	0.01
Distortion and noise with filter 30 kHz:			
20 Hz	%	0.004	0.008
1 kHz	%	0.004	0.008
S/N ratio without filter	dB	88	82.
S/N ratio with filter 30 kHz	dB	98	94
Dynamic range at 1 kHz	dB	98	95
Frequence responce: (0 dB at 1kHz)			
20 Hz	dB	±0	±0.3
100 Hz	dB	±0	±0.3
10 kHz	dB	±0	±0.3
20 kHz	dB	−0.2	±0.3
De-emphasis:			
1 kHz	dB	−0.4	−0.4±0.2
5 kHz	dB	−4.5	−4.5±0.5
16 kHz	dB	−9.04	−9.04±0.5
Channel seperation	dB	90	85
Channel Balance	dB	0	±0.3
Minimum operation voltage (% of normal supply voltage)	dB	80	85

ENVIRONMENTAL

Test to specification

Temperature between 59° F (15℃) and 95° F (35℃) and relative humidity between 45% and 75%, with power supply voltage of ±10% the nomal supply voltage.
Test disc: SONY YEDS-7 Type-3 or ABEX TCD-781

Operation

Unit must work properly and correctly at the temperature range from 32° F (0° C) to 113° F (45° C) and the relative humidity from 40% to 80%, and with the supply voltage.

Storage

Temperature test: 48 hours each at -40° F (-40° C) and 149° F (65° C)
Humidity test: 95° F (40℃) 95% relative humidity.

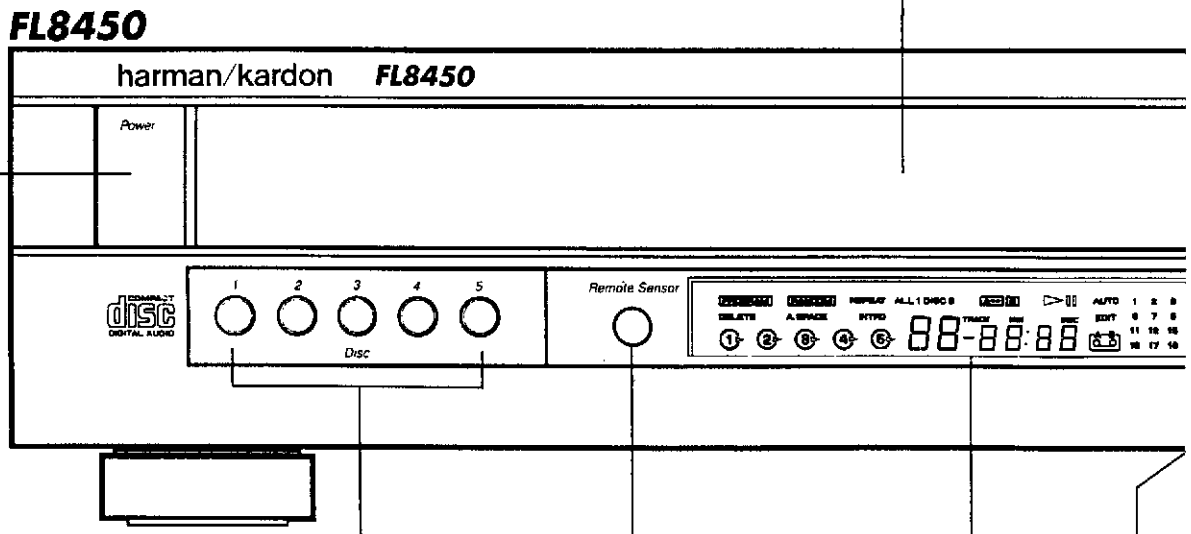
Notes:

1. Nominal specs represent the design specs. All unit should be able to approximate these—some will exceed and some may drop slight below these specs. Limit specs represent the absolute worst condition that still might be considered acceptable;in no case should a unit fail to meet limit specs.
2. This manual is based on the American standard, and provides information on regional circuit modification through the use of alternate schematic diagrams or wiring diagrams, and information on regional component variations through the use of parts lists. Design and specifications subject to change without notice.

CONTROL AND FUNCTIONS

POWER SWITCH
Press the POWER switch to turn on this unit and press it again to turn it off.
For system operation, plug the AC input cord into the switched AC outlet, keep the power switch ON and control power ON/OFF with the main POWER switch on the amplifier or receiver.

DISC TRAYS (1-5)
One disc per tray can be loaded with the labelled side up.



MULTI FUNCTION DISPLAY
This display shows the corresponding information according to each mode.

DISC SELECTOR BUTTONS
These buttons are used for selecting the disc to be played.

INFRARED RECEIVER WINDOW
This receives the infrared signals transmitted by the commander and converts it into the electrical signal to control this unit.

DI
Thi
firs
firs

RANDOI
This butt
automatic
on each C
random.

TIME BUTTON
This button is use
elapsed playing t
beginning of the
remaining playin
track or remainin
disc.

PROGRAM/REVIEW
This button is used for
your favorite tracks or
reviewing the program
selections.

BACKWARD SKI
SEARCH BUTTO
This button is used
the beginning of th
returning to a previ
searching for a part
fast reverse.

DISC INTRO BUTTON
This button is used for playing the first 10 seconds of each track or the first track on CDs.

RANDOM PLAY BUTTON
This button is used to let the unit automatically select and play tracks on each CD or discs and tracks at random.

REPEAT BUTTON
This button is used for repeating one track, one disc or all discs.

DELETE BUTTON
This button is used for deleting the undesired tracks or discs.

TIME BUTTON
This button is used for checking the elapsed playing time from the beginning of the current track, remaining playing time of the current track or remaining playing time of the disc.

EDIT BUTTON
This button is used for editing the tracks to be recorded onto the cassette tape.

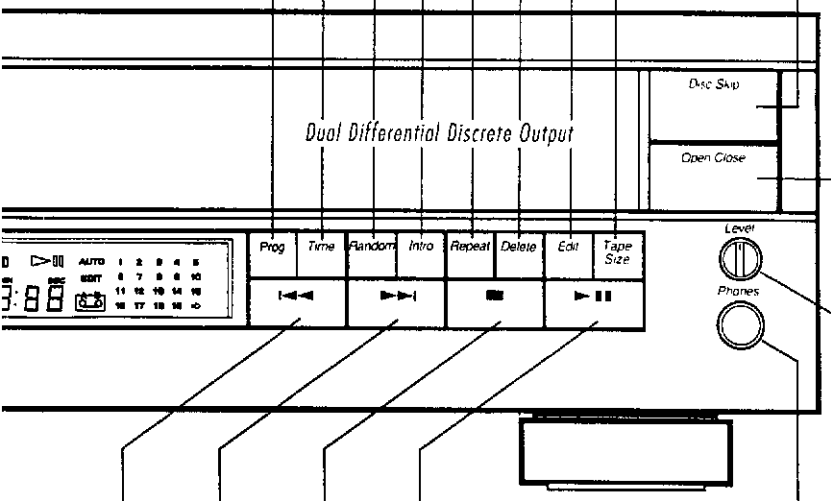
ROGRAM/REVIEW BUTTON
his button is used for programming our favorite tracks or discs or eviewing the programmed elections.

ith

TAPE SIZE BUTTON
This button is used for selecting the tape length.

DISC SKIP BUTTON
Each time this button is pressed to load or unload the disc, the carousel will rotate to the next tray position clockwise.

OPEN/CLOSE BUTTON
This button is used for opening or closing the tray.



ISPLAY
corresponding o each mode.

PLAY/PAUSE BUTTON
This button is used for starting play, holding play at the beginning of a track or interrupting play.

HEADPHONE VOLUME
This is used for the adjustment of the headphone level.

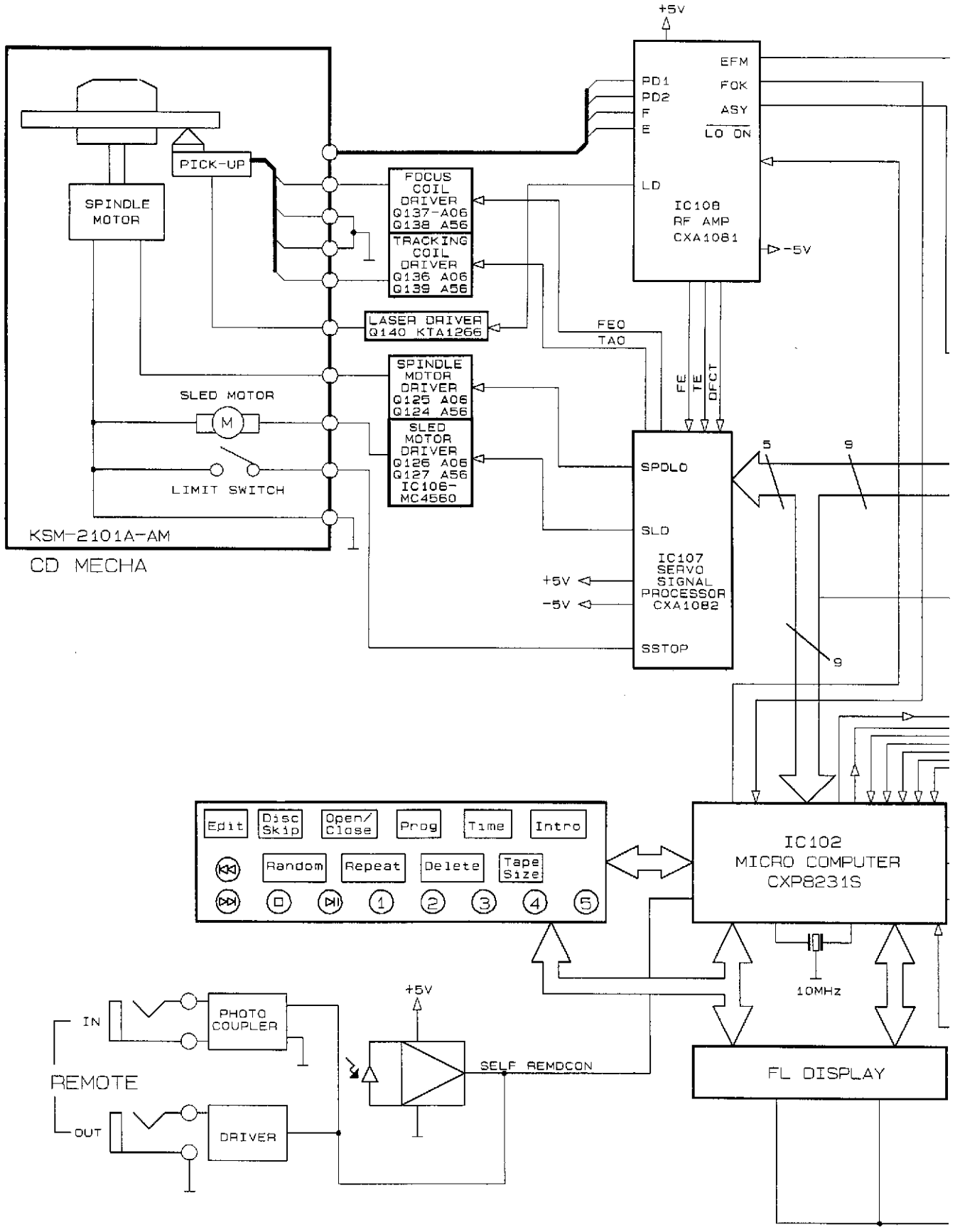
STOP/CLEAR BUTTON
This button is used for stopping play, clearing programmed selections or recovering the deleted selections.

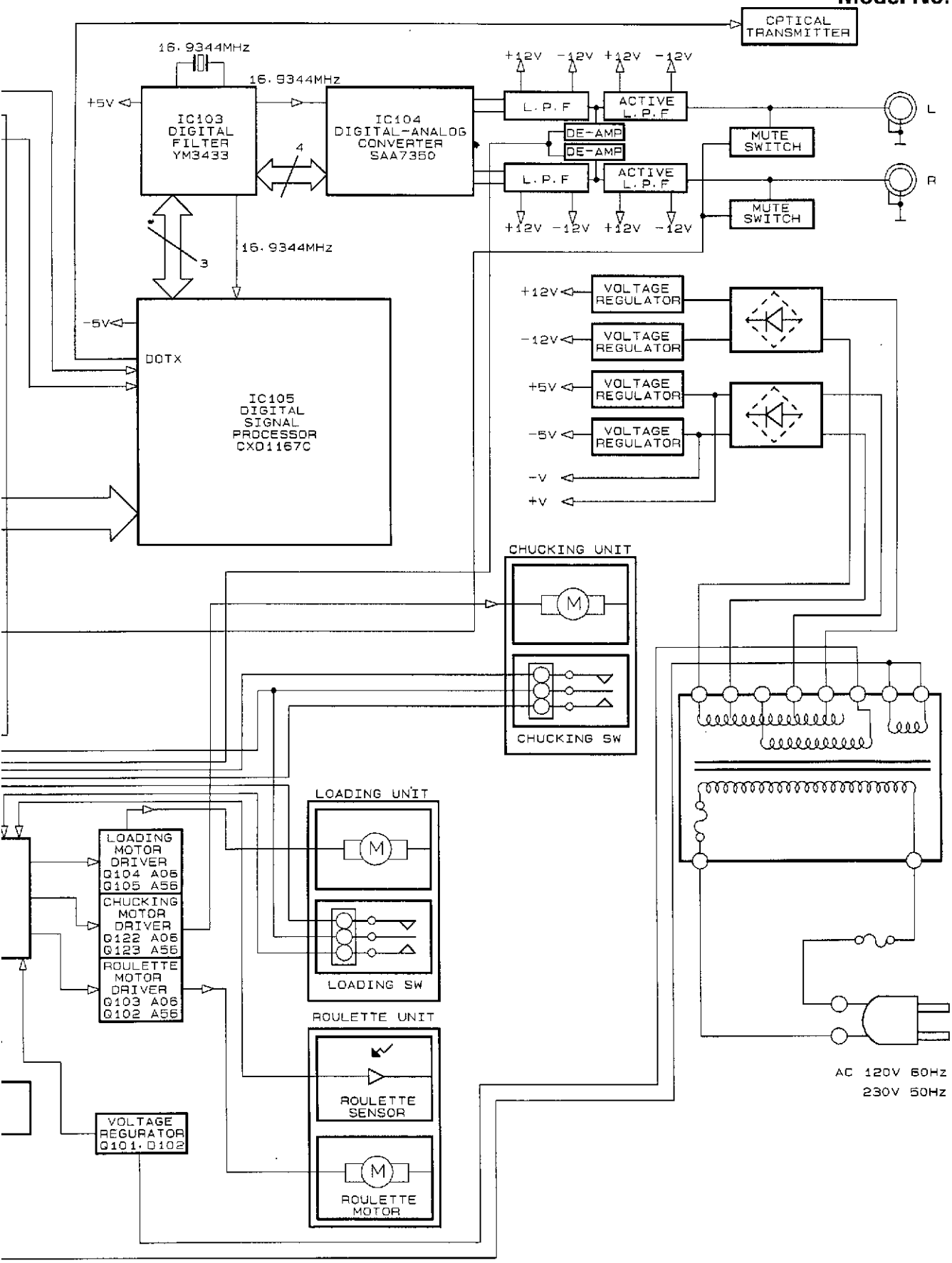
FORWARD SKIP/ SEARCH BUTTON
This button is used for moving on to a next track or searching for a particular passage in fast forward.

HEADPHONE JACK
This is used for listening with the headphones.

BACKWARD SKIP/ SEARCH BUTTON
This button is used for replaying from the beginning of the current track, returning to a previous track or searching for a particular passage in fast reverse.

BLOCK DIAGRAM




CPTICAL TRANSMITTER
16.9344MHz
16.9344MHz
+5V
IC103 DIGITAL FILTER YM3433
4
IC104 DIGITAL-ANALOG CONVERTER SAA7350
+12V -12V +12V -12V
L.P.F
ACTIVE L.P.F
DE-AMP
DE-AMP
L.P.F
ACTIVE L.P.F
+12V -12V +12V -12V
MUTE SWITCH
MUTE SWITCH
L
R
3
16.9344MHz
-5V
DOTX
IC105 DIGITAL SIGNAL PROCESSOR CXD1167C
+12V
VOLTAGE REGULATOR
-12V
VOLTAGE REGULATOR
+5V
VOLTAGE REGULATOR
-5V
VOLTAGE REGULATOR
-V
+V
CHUCKING UNIT
M
CHUCKING SW
LOADING UNIT
M
LOADING SW
LOADING MOTOR DRIVER Q104 A06 Q105 A56
CHUCKING MOTOR DRIVER Q122 A06 Q123 A56
ROULETTE MOTOR DRIVER Q103 A06 Q102 A56
ROULETTE UNIT
ROULETTE SENSOR
M
ROULETTE MOTOR
VOLTAGE REGURATOR Q101, D102
AC 120V 60Hz
230V 50Hz

DISASSEMBLY INSTRUCTIONS

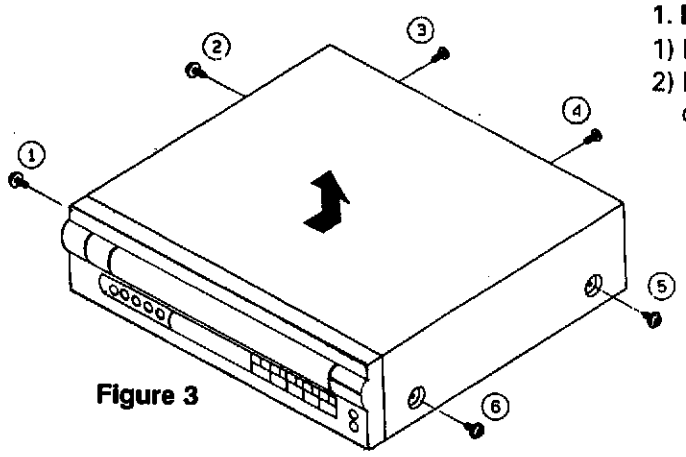


Figure 3

1. Remove the top cover (Figure 3).

1) Remove 6 screws (① to ⑥) holding the top cover.
2) Remove 1 screw and then lug wire from the bottom chassis.

2. Remove the bottom cover (Figure 4).

1) Turn the set over.
2) Remove 9 screws (① to ⑨) from the bottom chassis.
3) Remove 2 screws (⑩, ⑪) from the back chassis.

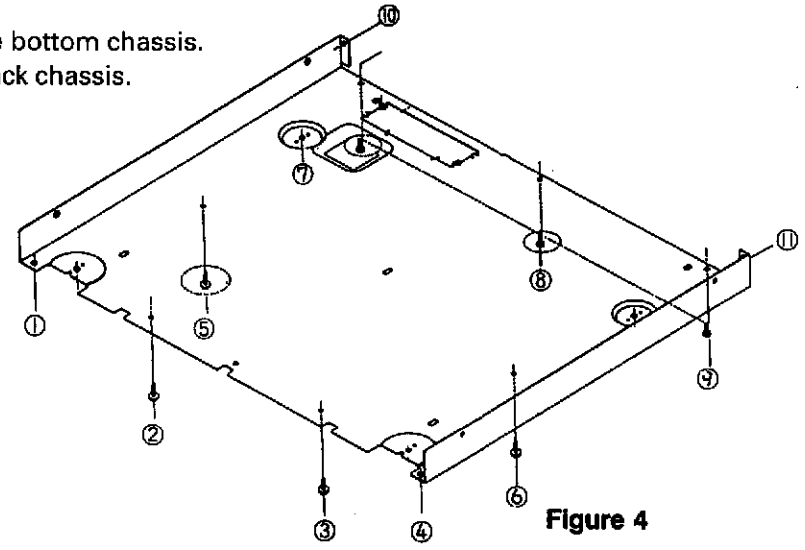


Figure 4

3. Remove the front panel (Figure 5).

1) Remove 3 screws (① to ③).
2) Remove 2 connectors (CNT101, CNT103) from the main B'D.
3) Remove 3 screws (④ to ⑥).
4) Turn to the clockwise gear loading of the assembly lock gear (see figure 6).
5) Hold the cover tray and then pull it up.
6) Remove 2 connectors (109, CNT112) from the main B'D.

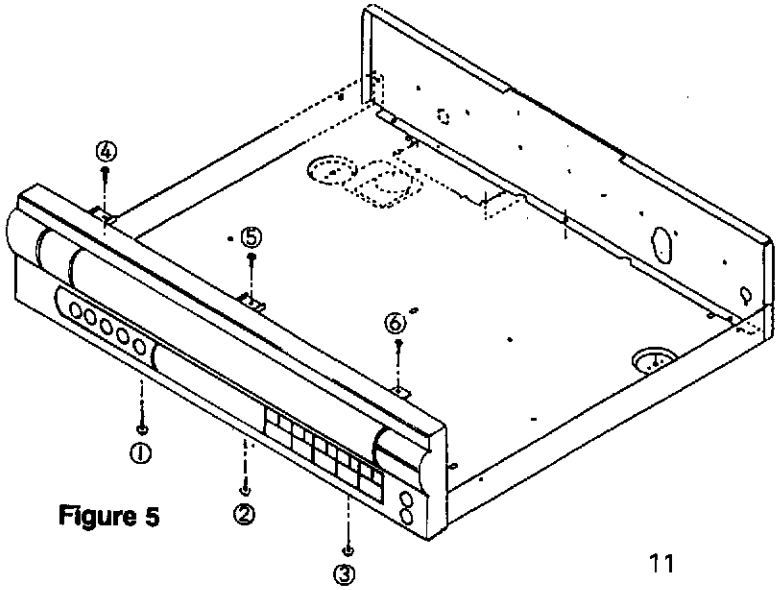
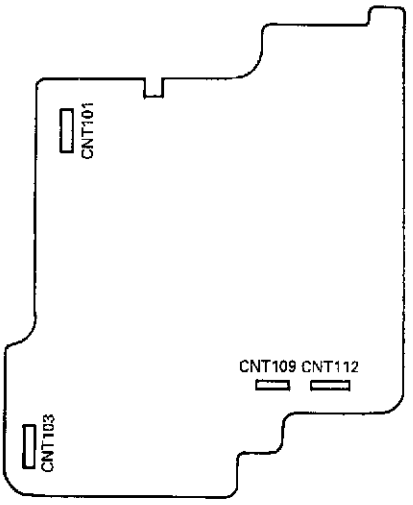


Figure 5



4. Remove the loading table (Figure 6).

1) Remove 4 screws (① to ④) holding the frame body.
2) Remove 4 screws (⑤ to ⑧) holding the assembly chuck.
3) Remove the assembly chuck.
4) Stretch out the frame body and then remove.
5) Remove 2 screws ⑨ and ⑩ holding the left guide tray (F) (same as right guide tray).
6) Pull the roulette tray up to the front and hold it up.
7) Remove the lead assembly 4P from CNT104-P on the sensor B'D.

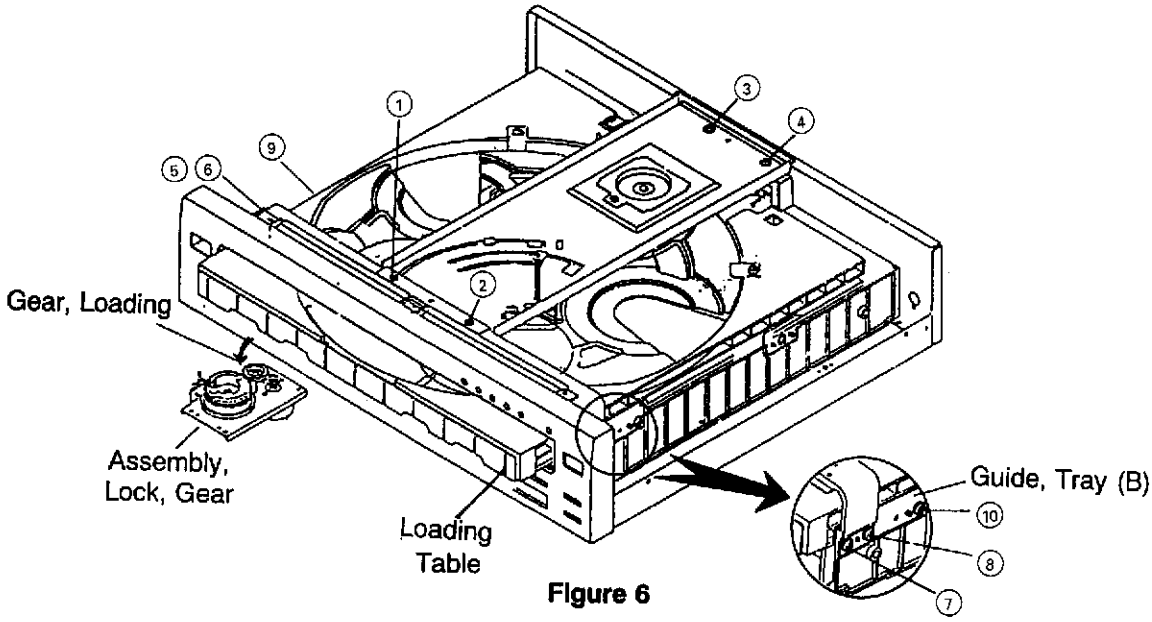


Figure 6

5. Remove the main board (Figure 7).

1) Disconnect all lead assembly.
2) Release the 4 tabs (attached to the main board) from the body mechanism.

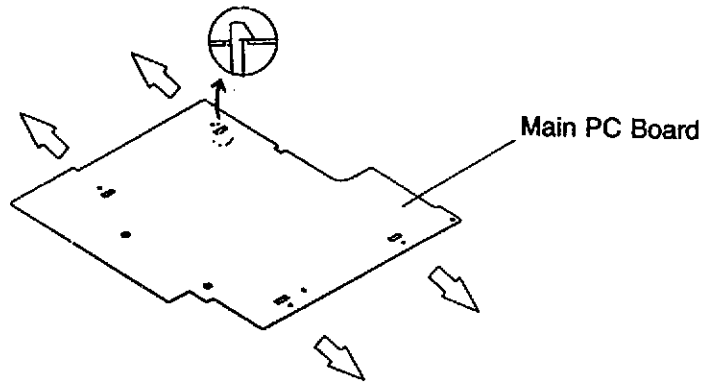


Figure 7

PICKUP REPLACEMENT

Caution:
Laser diodes are extremely susceptible to damage from static electricity. Even if a static discharge doest not ruin the diode, it can shorten its life or cause it to work improperly. When replacing the pickup, take appropriate measures, such as using a conductive mat and a grounded soldering iron, to protect the laser diode from static damage.

1. Remove the CD mechanism assembly by refering to the "exploded view" (See Figure 8).

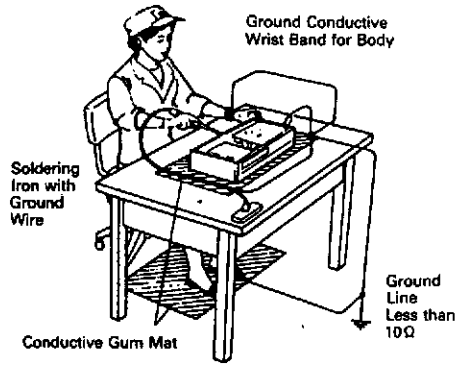


Figure 8

2. Remove four screws S12 (See Figure 9).

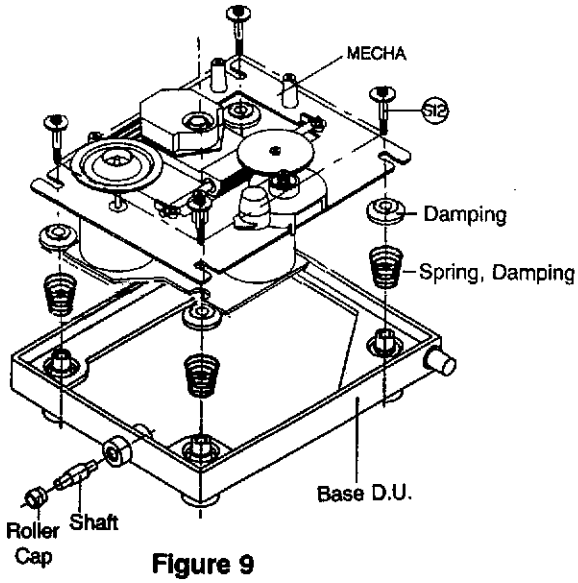


Figure 9

3. Remove the gear A (See Figure 10).
4. Pull out the slide shaft.

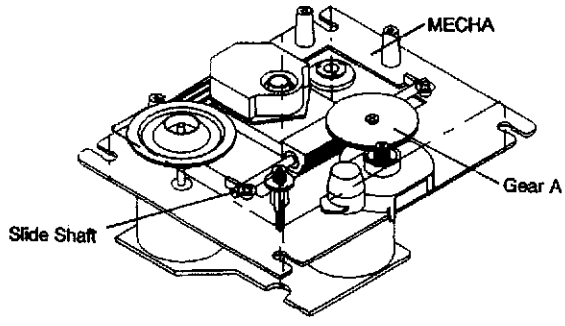


Figure 10

5. Remove the pickup (See Figure 11).

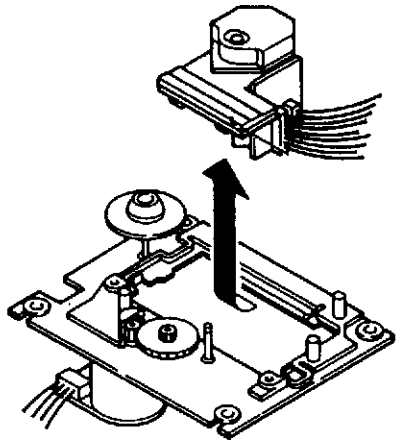


Figure 11

6. After you connect the wire connector, desolder and remove the shorting tab (See Figure 12).

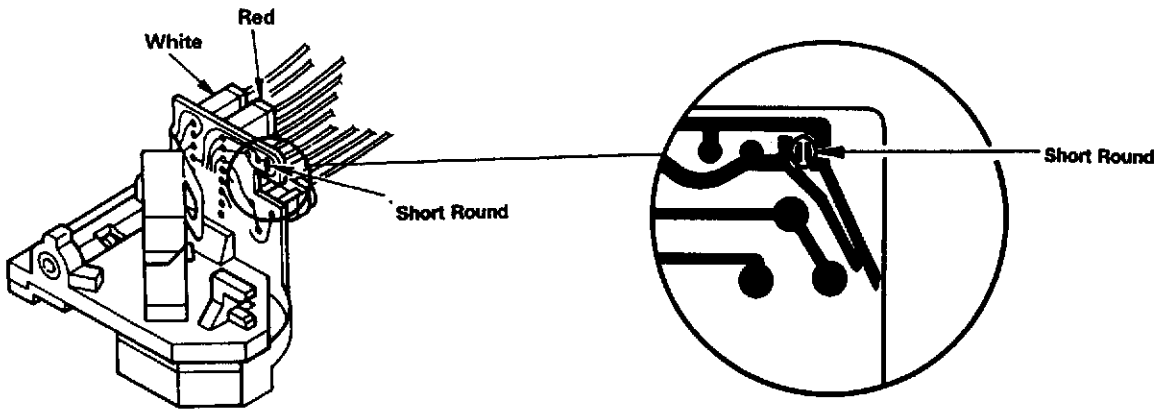


Figure 12

7. Refer to the exploded view of the compact disc mechanism on page 39 for detailed illustrations.

OPERATION CHECK

When the power switch is turned on after the chucking arm is removed, observe the objective lens and check the following. (The optical system block should be at the lead-in position when it is checked.)

1. The disc table should be at the innermost position after the chucking arm is removed.
2. The diffused light of the laser beam can be seen when the power switch is turned on.
3. Vertical (up and down) movement of the objective lens take place (2 or 3 times).

CIRCUIT DESCRIPTION

1. APC CIRCUIT

A semiconductor laser is used as the light source for the optical pickup. As the laser diode has large negative temperature characteristics in its optical output when driven with a constant current, a circuit must be provided to stabilize this output. For this purpose, a monitor diode which detects the optical output of the laser diode is used in the semiconductor laser.
As the laser diode emits light from its bonded surface, light is emitted both in front and behind. The light emitted behind is monitored with the monitor diode installed on its rear surface, and the optical output is thus controlled. The light emitted in front becomes the light source for the pickup.

Fig. 1 Shows the APC circuit.
When the temperature rises and the optical output decreases, the monitor diode current (IS) decreases, the electric potential of IC108 pin 5 rises, the base current of the driving transistor increases, and the laser diode current increases. This causes the reduced optical output to return to its former level.

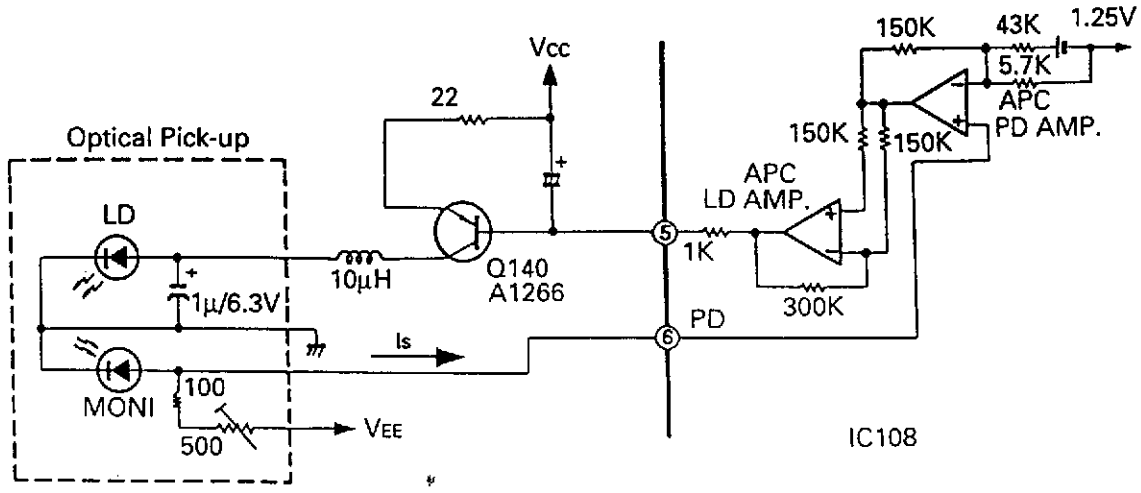
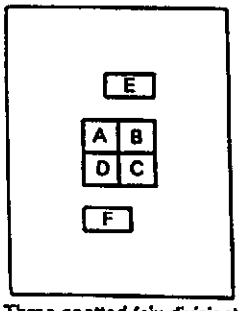


Fig. 1

2. FOCUS SERVO

2-1. Optical pickup

This set employs a three-beam optical pickup comprised of six division photodiodes, A through F as shown in Fig. 2. The four photodiodes (A through D) at the center provide focus error detection by using their property to allow the beam to focus into a round image only at a certain point.
The sums of outputs from diagonal two elements of four division photodioddes (A+C and B+D) are compared by the differential amplifier in IC108 to detect the shape of the beam image.
The remaining two diodes (E and F) provide tracking error detection by means of sub-beam spots.



Three spotted (six-division) photo diodes

Fig. 2

2-2. Focus error detecting operation

The reflected laser beam from a disc is polarized 90° with the beam-splitter and sent to the cylindrical lens. The beam passed through this cylindrical lens is then sent to the four division photodiodes and focuses into an image whose shape varies with the distance between the disc and the objective lens. Such change in the beam shape causes the current flowing from the photodiodes to vary.

Shown in Fig. 3 is the principle of the focus error detection.
The currents from the photodiodes (A+C and B+D) are applied to pins 7 and 8 of IC108 and converted to voltage by RF I-V amplifiers (1) and (2) included in IC108.

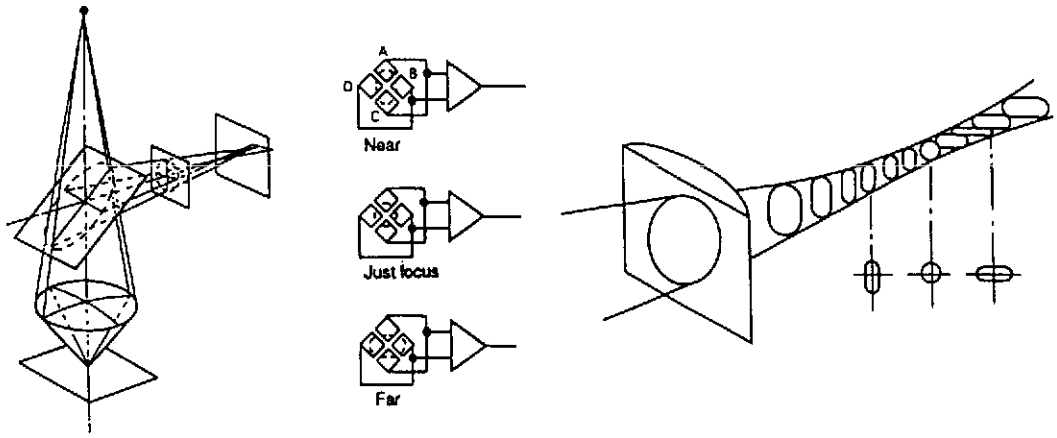


Fig. 3

2-3. Focus servo control operation

The focus error signal, after being converted to voltage by the RF I-V amplifier, is transmitted to the operation amplifier in the IC and output from pin 19.
When the disc to objective lens distance is in focus, the beam forms a true round. In this state, the beams applied to four elements of four division photodiodes become equal and thus the output provided then is 0(zero). When the disc to objective lens distance is too close (near focus), the beam is reflected divergently to form an oval in crosswise direction. In this state, the outputs provided from photodiodes A and C are higher than those from B and D, resulting in negative (–) output voltage. On the other hand, when the distance is too far (far focus), the beam is reflectd convergently to form an oval in longitudinal direction. Then the outputs from photodiodes B and D are higher, resulting in positive (+) output.
The output voltage (focus error signal) from pin 19 of IC108 passes through IC107, in from pin 6 and out from pin11,as shown in Fig. 4. It is amplified in IC107 and fed to the focus coil which then drives the objective lens of the pickup.

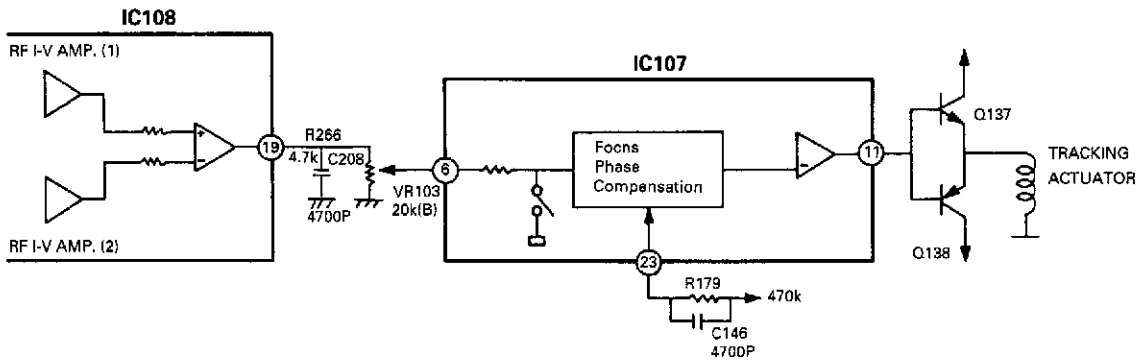


Fig. 4

2-4. Tracking error detection system

Fig. 5 Shows the principle of the tracking error detection system which employs the three beam system. The laser beam is divided into the main beam and two sub-beams by diffraction grating and they are arranged on one line. The center line connecting these three beams has a slight offset angle against the main beam. The main beam is received by photodiodes A, B, C and D and two sub-beams by E and F respectively.

Fig. 5-A shows the on-track state. As both auxiliary beams 1 and 2 are slightly on the track in this state, the outputs of photodiodes E and F are equal and the tracking signal is 0(zero). When the track is shifted to the left (Fig. 5-B), the auxiliary beam 1 is off the pit. This allows more light to be received by the photodiode E, resulting in positive (+) tracking signal output. On the other hand, when the track is shifted to the right (Fig. 5-C), the amount of light received by the photodiode F increases, resulting in negative (-) tracking signal output. And these extreme signals are detected as tracking error signals.

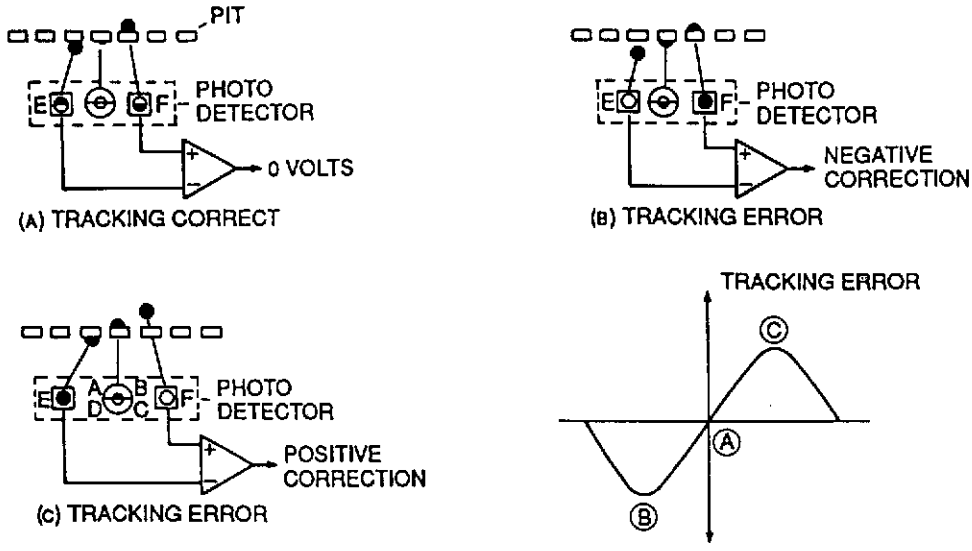


Fig. 5

2-5. Tracking servo control operation

When a tracking error signal is detected by photodiodes E and F, it is fed to pins 11 and 10 of IC108 respectively as shown in Fig. 6. In IC108, the signal is converted into voltage by the E I-V amplifier and F I-V amplifier, transmitted to the tracking error amplifier and output through pin 20. While it passes through IC107, in from pin 3 and out from pin 17, it is amplified in IC107 and sent to the tracking coil to adjust pickup so that the amount of track shift is reduced as closely to none as possible.

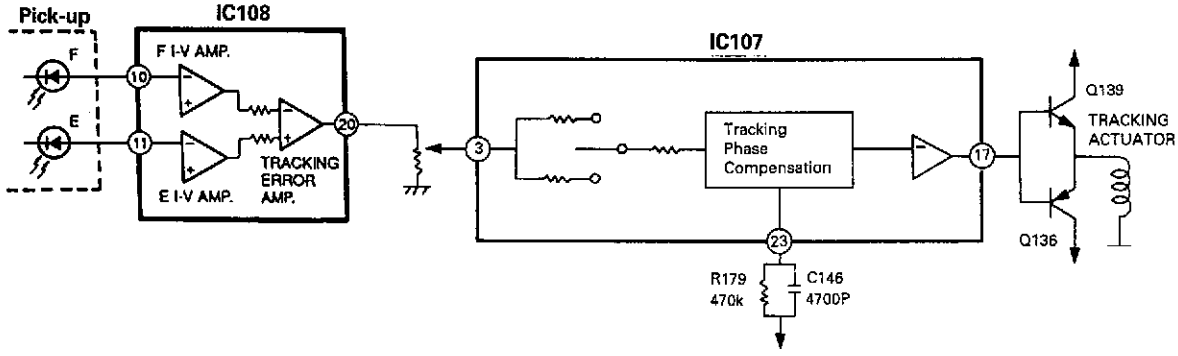


Fig. 6

3. Regenerative Circuit

3-1. RF circuit

The currents from photodiodes (A, B, C and d) are fed to IC108 through pins 7 and 8 and converted to voltage by RF I-V amplifiers (1) and (2) respectively there, added by the RF summing amplifier and output from pin 2 as a signal. It can be checked at the test point (RF T.P.) provided on its way by means of the eye pattern check.

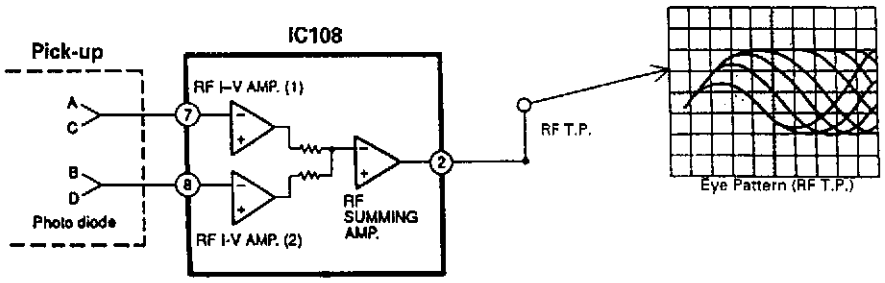


Fig. 7

3-2. EFM demodulation, error correection, serial/parallel conversion

The EFM comparator changes RF signal into a binary value. As the asymmetry generated due to variations in disc manufacturing cannot be eliminated by the AC coupling along, the reference voltage of EFM comparator is controlled utilizing the fact that the generation probability of 1, 0 is 50% each in the binary EFM signals.

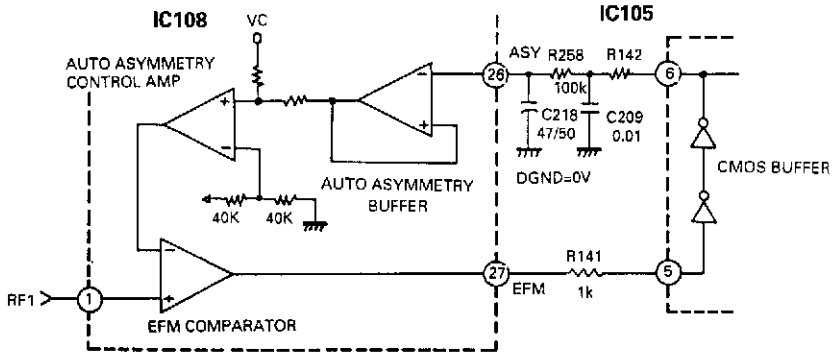


Fig. 8

As this comparator is a current SW type, each of the H and L levels does not equal the power supply voltage, requiring feedback through a CMOS buffer.
R8, R9, C8, and C9 form a LPF to obtain (Vcc+DGND)/2V, When fc (cut-off frequency) is made more than 500 Hz the EFM low-frequency component leaks badly, degenerating the block error rate.

3-3. Digital Signal Processor

The EFM signals from pin 27 of IC108 are sent to pin 5 of IC105, then demodulated from 14 bits to 8 bits by EFM readjustment. At the same time any error, if found, is corrected (CIRC) and the signals are sent to the D/A converter interface. After that they are output as 16-bit digital signals from pins 76, 78 and 80 of IC105 and fed to the D/F of IC103. In this case, EFM demodulation, error correction and serial/Parallel conversion are performed by the internal circuitny of IC105.

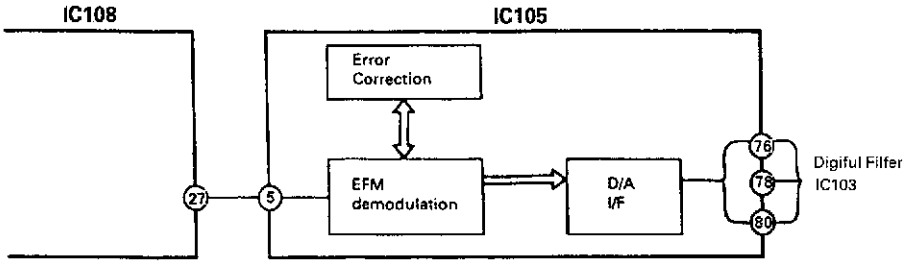


Fig. 9

4. Audio Circuit

4.1 Configuration of SAA7350

Fig. 10 Shows the configuration of the SAA7350.

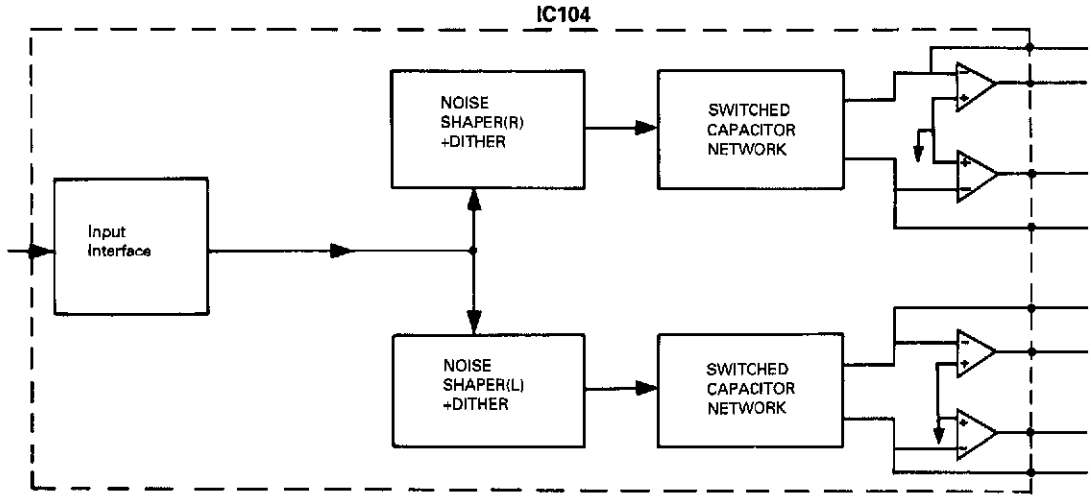


Fig. 10

The digital-to-analogue conversion in the SAA7350 is performed using the Philips Bitstream Conversion technigue. The input from the digital filter is oversampled and converted to a 1-bit pulse density modulated (PDM) signal. A switched capacitor technigue is used for the Bitstream Conversion to convert the PDM signal to an analogue signal. A fixed chage is either added or substracted from the virtual earth node of an integrator. As this output is a continous time output, a highly symmetrical operational amplifier is used to give a low distortion figure.

4.2 Audio Circuit

Fig. 11 Shows a block diagram of the audio circuit.

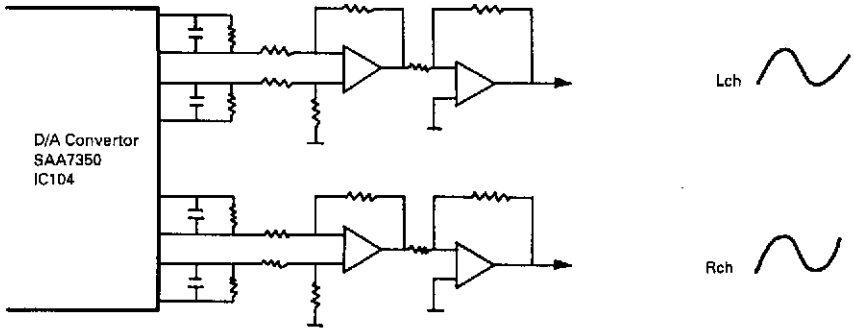


Fig. 11

The output from pin38 (INTC+) and pin34 (INTL–) of the IC104 DIA Converter SAA7350 is input to the differential input amplifier, which is symmetrical in the up and down directions, of the discrete circuit configured of the following stage, which includes Q132, Q133, Q134, Q135, Q145, Q146, Q147 and Q148 The output undergoes differential synthesis in this cirucit, and after synchronous-phase noise has been eliminated, the resulting signal is output.

To the low-pass filter of the discrete circuit configuration of the following sfage as an audio signal.

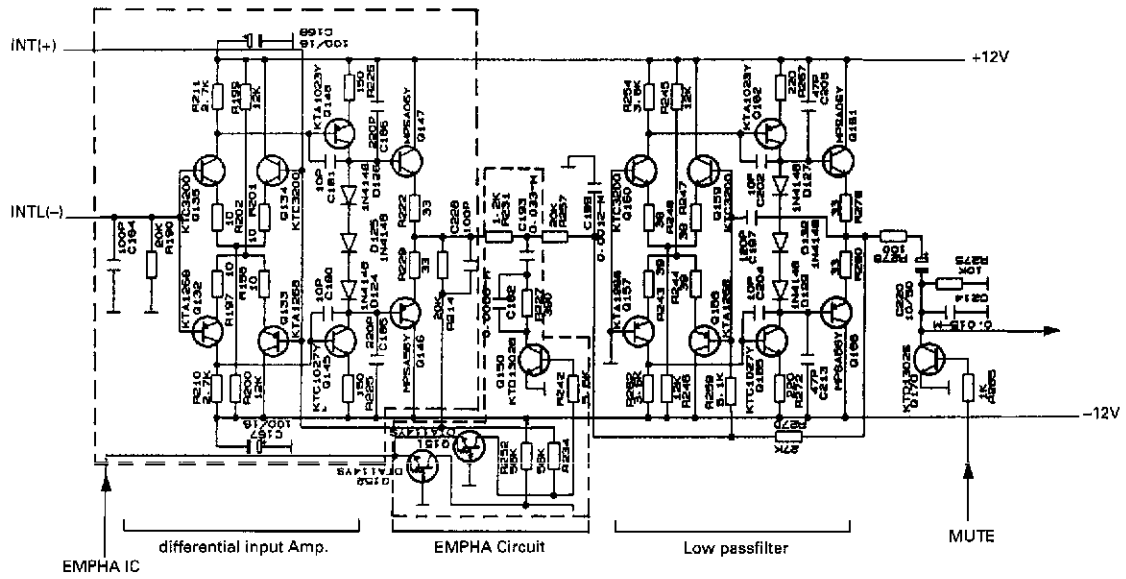


Fig. 12

ALIGNMENT AND ADJUSTMENT

TEST POINT LOCATION

EQUIPMENT REQUIRED:

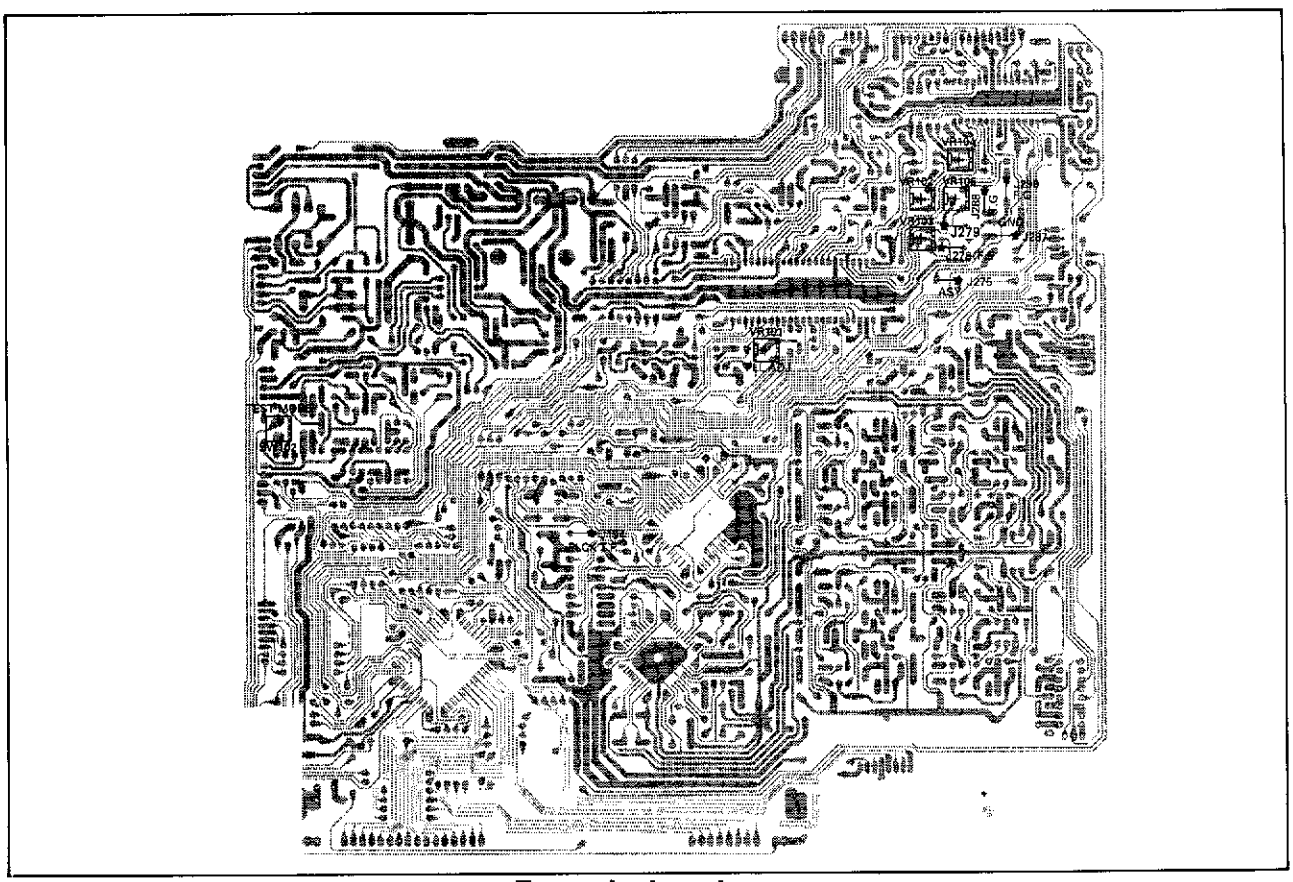
- Oscilloscope over 50 MHz
- Frequency counter
- Test disc PHILIPS 5A
- A regular compact disc

BEFORE ADJUSTMENTS:

- Make adjustments in numerical order.
- Use the dualtrace oscilloscope with high impedance (greater than 10 Mohm).
- How to enter into the test mode:
  1) Open the disc tray.
  2) Turn off power.
  3) Turn on power while pressing "SW102 (TEST MODE)".
  4) "8" or all segments appear in the display indicates the test mode
  5) If you press PLAY, again the test mode change to TEST MODE 1.
  6) If you press PLAY, again the test mode change to TEST MODE 2.
  7) If you press PLAY, again the test mode change to TEST MODE 3.
- Initial semi-fixed VR setting.

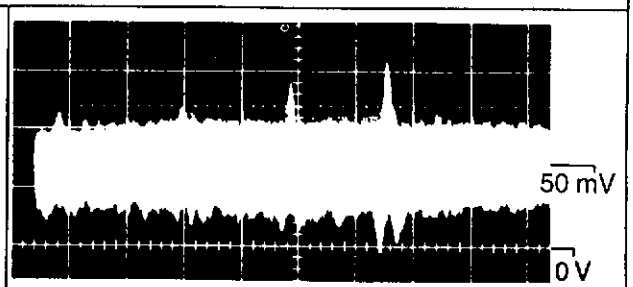
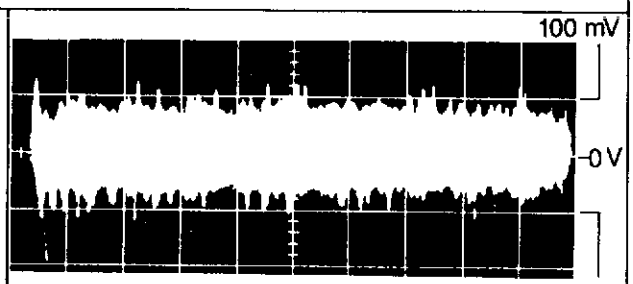
  Set the semi-fixed resistance tentatively as follows:

VR101 (PLL)	Center position
VR103 (F. Gain)	Turn fully counterclockwise
VR105 (T. Gain)	Turn fully clockwise
VR102 (F. Bias)	Center position
VR104 (EF Balance)	Center position



Test point Locations

CIRCUIT ADJUSTMENT

Step	Connect	Setting	Adjust	Remarks
Focus Gain Adjustment				
1	See figure 13	In TEST MODE 2	VR103	 Focus error signal of about 50 mV.
2	To increase the focus gain, turn VR103 clockwise.			
Tracking Gain Adjustment				
1	See figure 14	In TEST MODE 2	VR105	 Obtain a tracking drive signal of about 200 mV.
2	Place PHILIPS test disc 5A in the tray and play section with the 800µm black dot, Confirm there is no skipping.			
3	If there is any skipping, adjust VR105 to reduce the tracking servo gain untill no skipping occurs. To reduce the gain, turn VR105 rclockwise.			

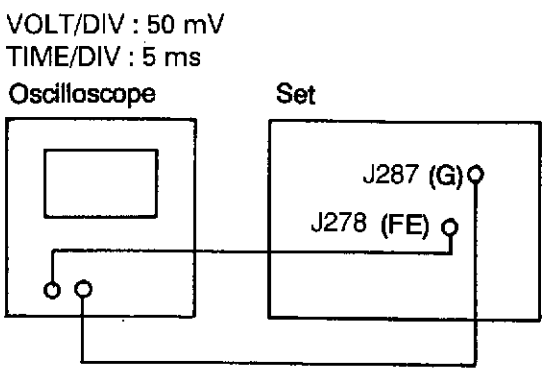


Figure 13. Focus Gain Adjustment

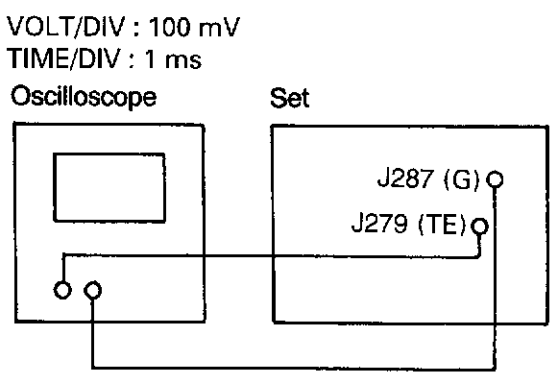
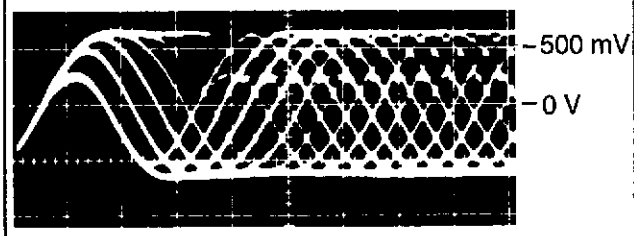


Figure 14. Tracking Gain Adjustment

Step	Connect	Setting	Adjust	Remarks
Focus Offset Adjustment				
1	See figure 15	In TEST MODE 2	VR102	**Obtain the maximum amplitude and the biggest diamond windows of the eye pattern.**  The above an example of a good eye pattern.
2	To make the diamond windows in the portion large and clear, turn VR102 clockwise.			

Coupling : AC
VOLT/DIV : 500 mV
TIME/DIV : 0.2 μS

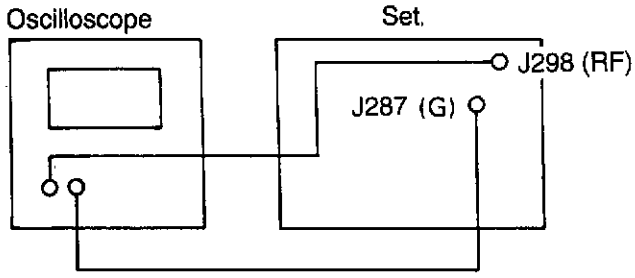
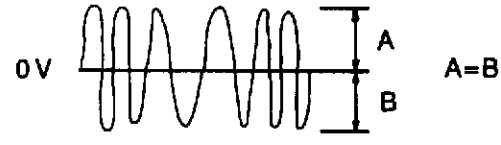


Figure 15. Focus Offset Adjustment

Step	Connect	Setting	Adjust	Remarks
PLL (Phase Locked Loop) Adjustment.				
1	See figure 16	In TEST MODE 0	VR101	Counter reading should be 4.3218 MHz
2	Disconnect between J287 (GND) and J275 (ASY).			
3	Check the counter reading to be 4.3218 ±0.0025 MHz in TEST MODE 0.			
EF Balance Adjustment				
1	See figure 17	In TEST MODE 1		 VOLT/DIV: 1 V TIME/DIV: 1 ms
2		Turn a disc gently with your finger and adjust VR104 to obtain a symmetrical waveform.	VR104	Obtain a symmetrical waveform.
3	The above adjustments must be made very carefully, as misadjustment may cause skipping.			

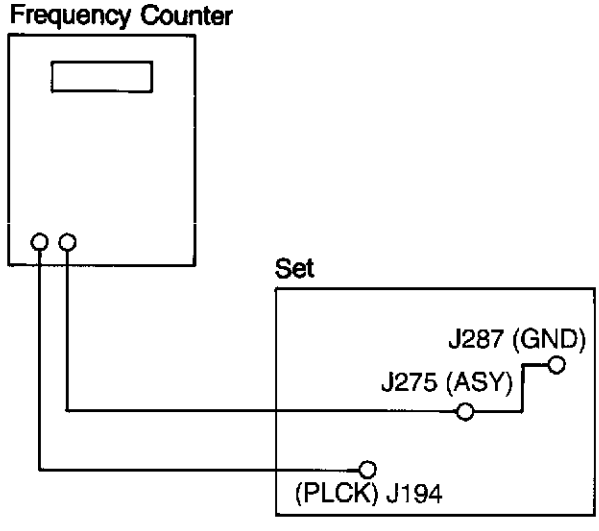


Figure 16. PLL Adjustment

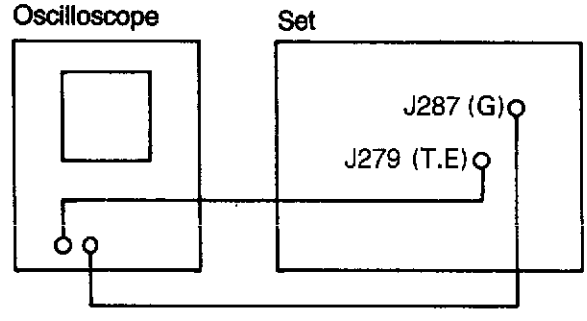
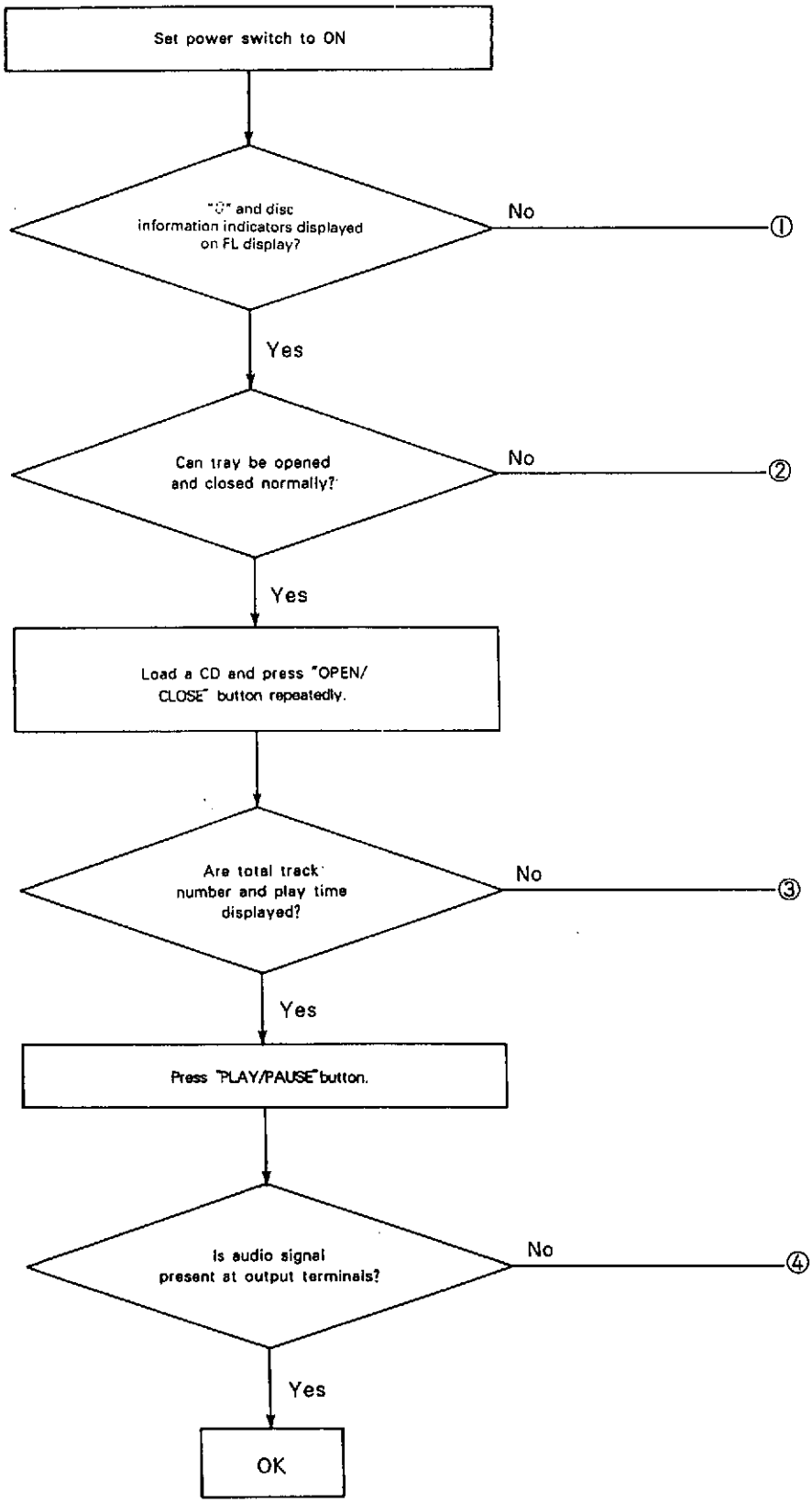


Figure 17. EF Balance Adjustment

TROUBLESHOOTING



At power on. "0" and some parts are not displayed.

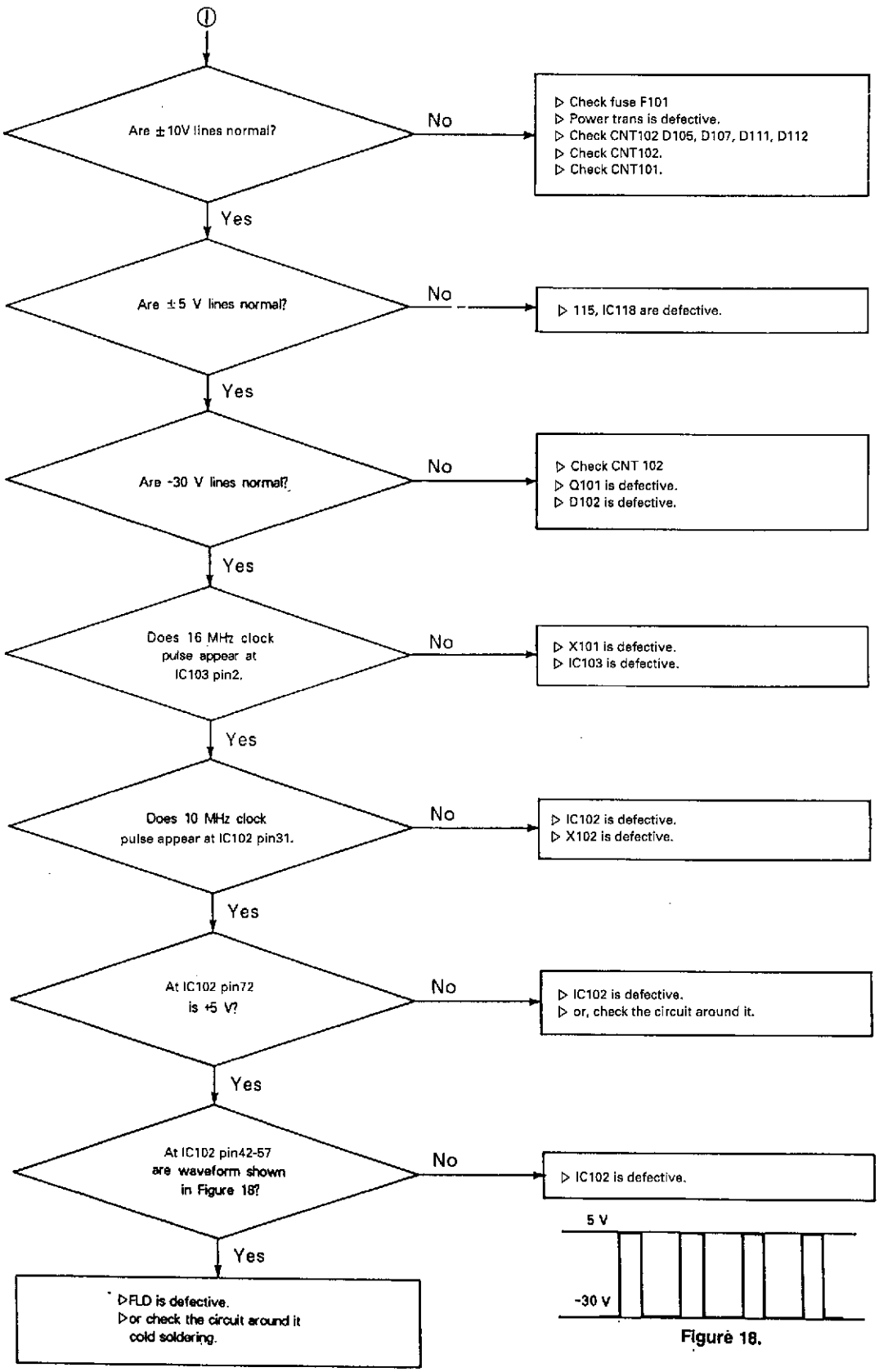
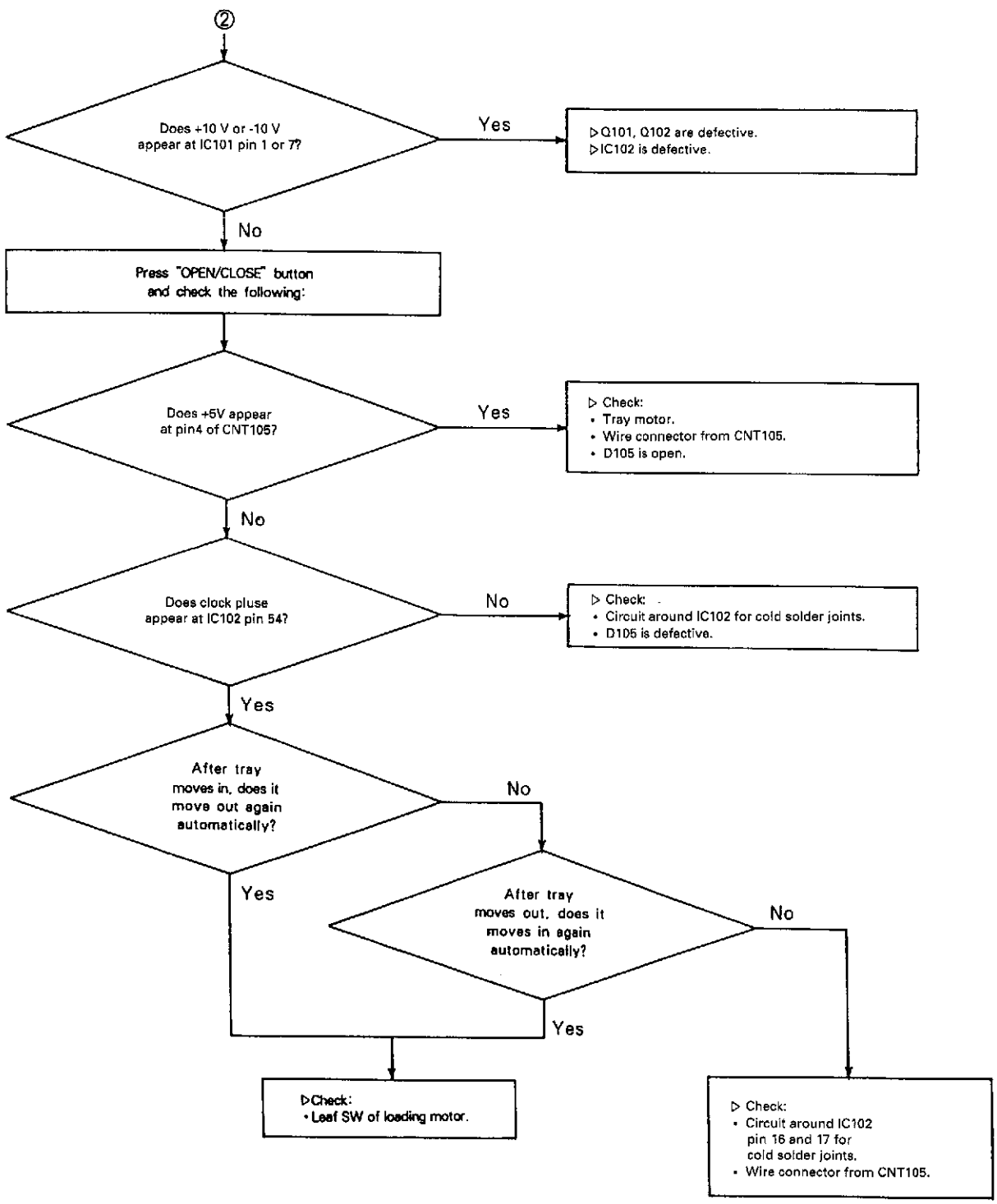
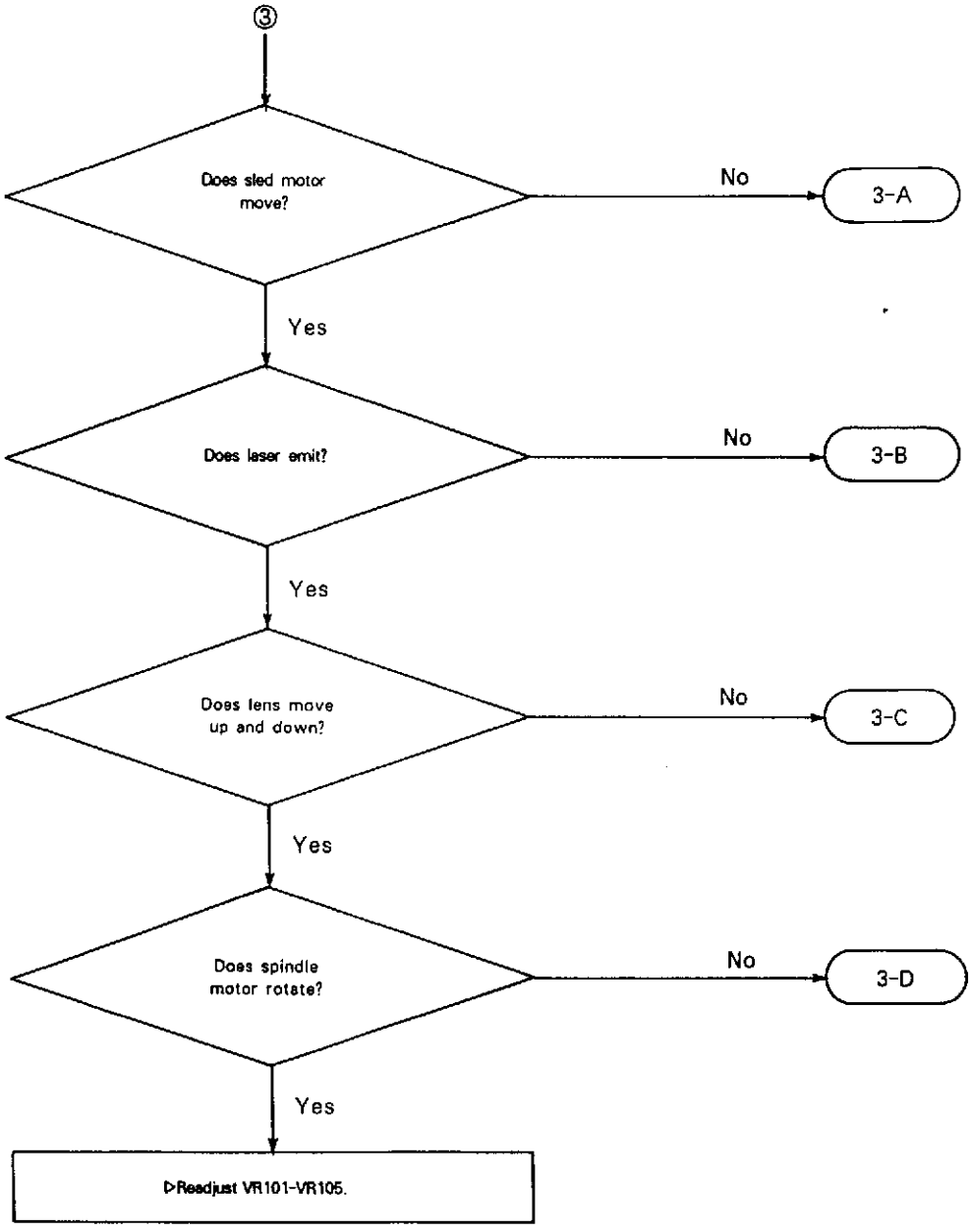


Figure 18.

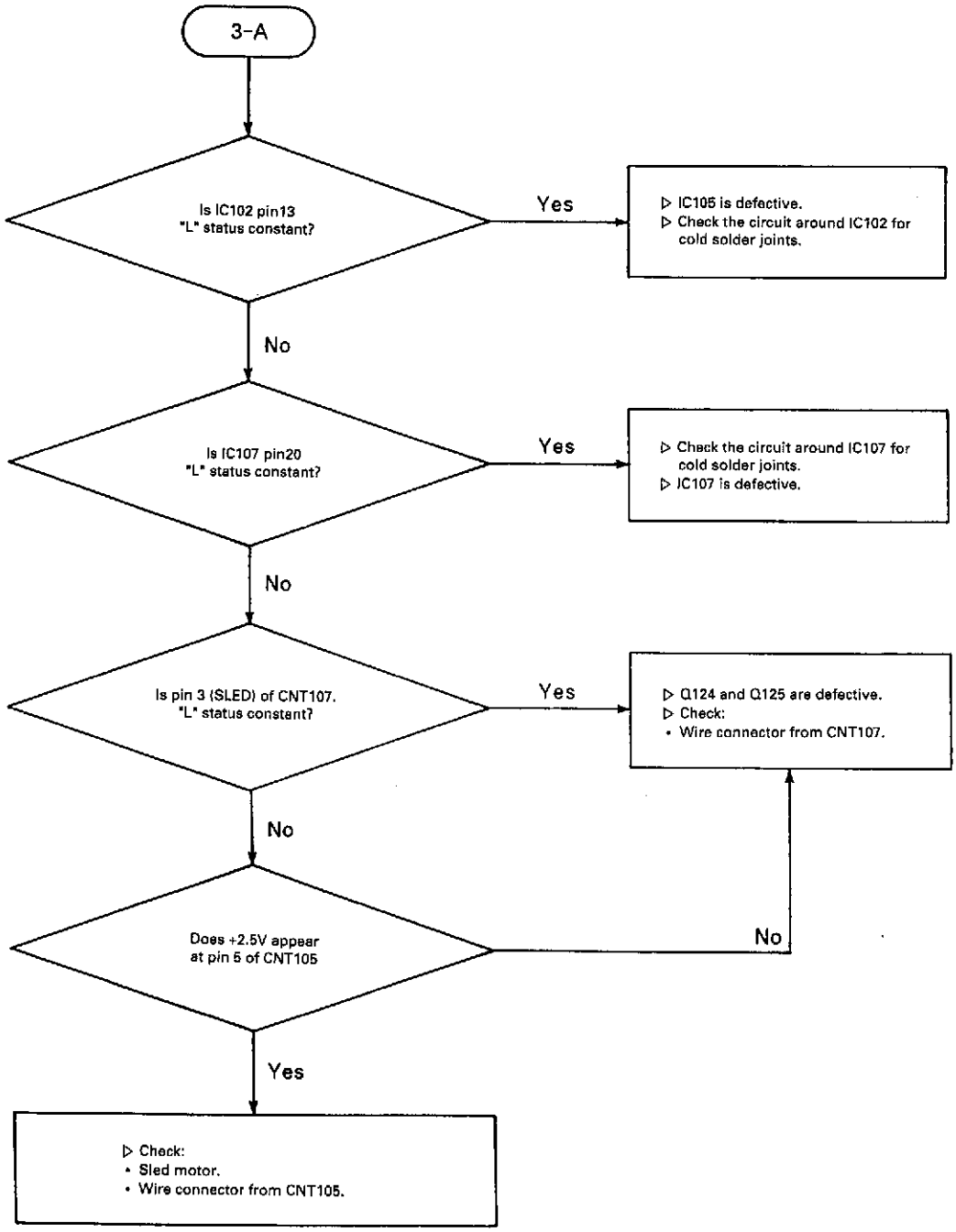
Tray cannot be opened and closed by pressing "OPEN/CLOSE" button.


②
Does +10 V or -10 V appear at IC101 pin 1 or 7?
Yes
▷Q101, Q102 are defective.
▷IC102 is defective.
No
Press "OPEN/CLOSE" button and check the following:
Does +5V appear at pin4 of CNT105?
Yes
▷ Check:
• Tray motor.
• Wire connector from CNT105.
• D105 is open.
No
Does clock pluse appear at IC102 pin 54?
No
▷ Check:
• Circuit around IC102 for cold solder joints.
• D105 is defective.
Yes
After tray moves in, does it move out again automatically?
No
Yes
After tray moves out, does it moves in again automatically?
No
Yes
▷Check:
• Leaf SW of loading motor.
▷ Check:
• Circuit around IC102 pin 16 and 17 for cold solder joints.
• Wire connector from CNT105.

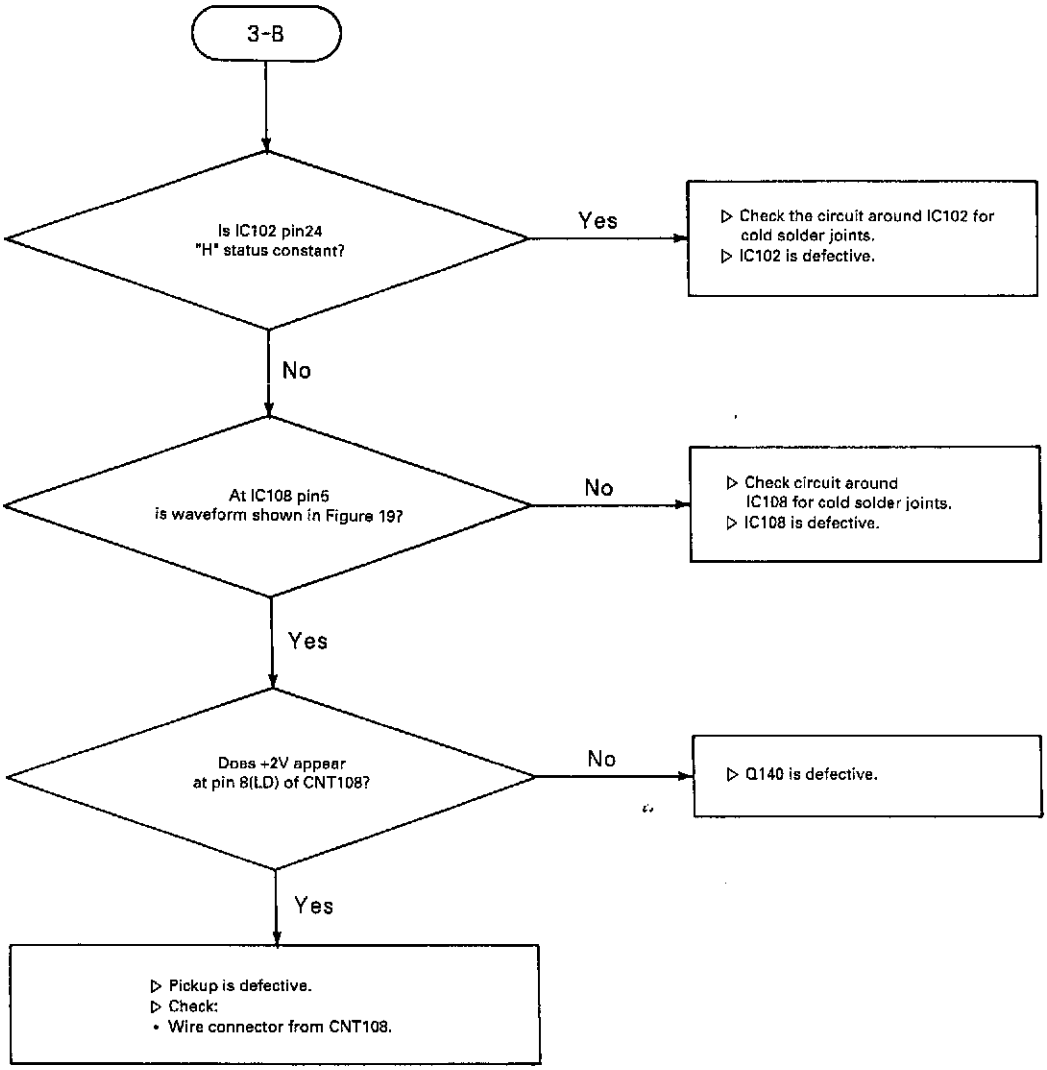
"0" is displayed instead of total track number and play time.



Sled motor does not move.



Laser does not emit.


3-B
Is IC102 pin24 "H" status constant?
Yes
▷ Check the circuit around IC102 for cold solder joints.
▷ IC102 is defective.
No
At IC108 pin5 is waveform shown in Figure 19?
No
▷ Check circuit around IC108 for cold solder joints.
▷ IC108 is defective.
Yes
Does +2V appear at pin 8(LD) of CNT108?
No
▷ Q140 is defective.
Yes
▷ Pickup is defective.
▷ Check:
• Wire connector from CNT108.

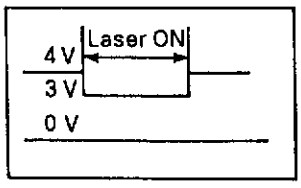


Figure 19

Object lens of pickup unit does not move up and down.

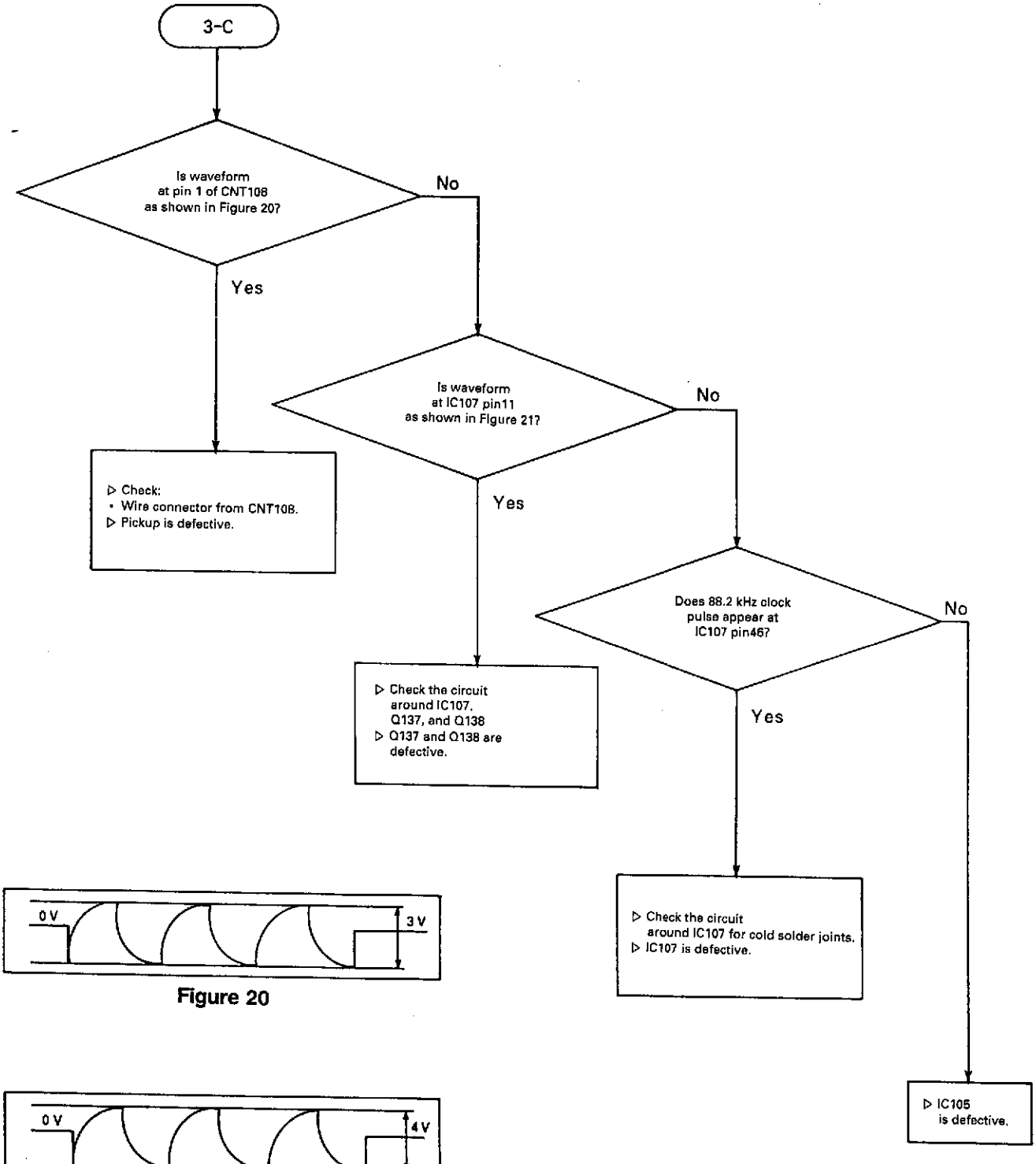

3-C
Is waveform at pin 1 of CNT108 as shown in Figure 20?
No
Yes
Is waveform at IC107 pin11 as shown in Figure 21?
No
Yes
Does 88.2 kHz clock pulse appear at IC107 pin46?
No
Yes
▷ Check:
• Wire connector from CNT108.
▷ Pickup is defective.
▷ Check the circuit around IC107, Q137, and Q138
▷ Q137 and Q138 are defective.
▷ Check the circuit around IC107 for cold solder joints.
▷ IC107 is defective.
▷ IC105 is defective.

Figure 20

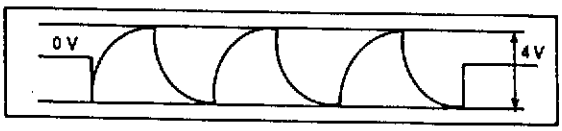
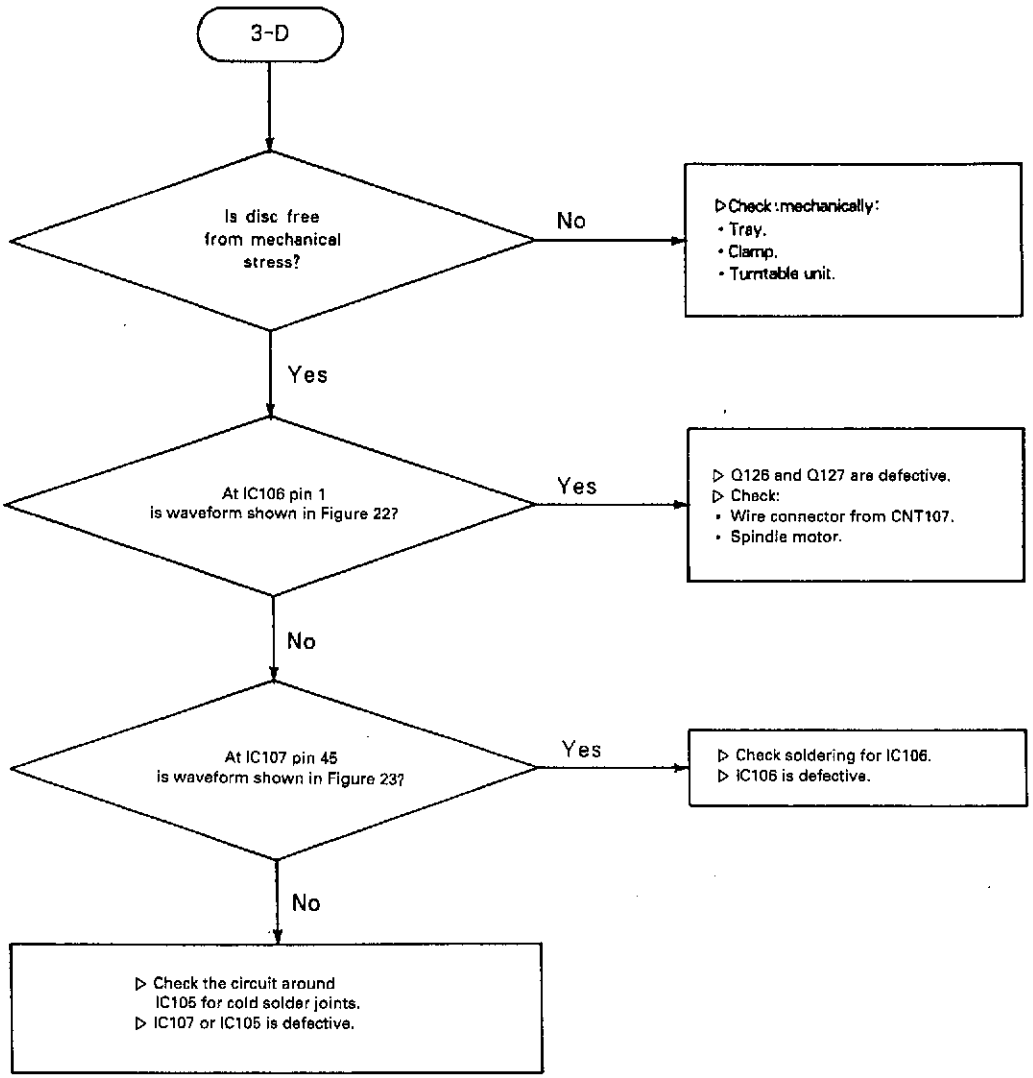


Figure 21

Spindle motor does not rotate.



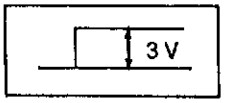


Figure 22

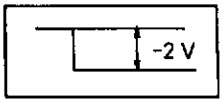
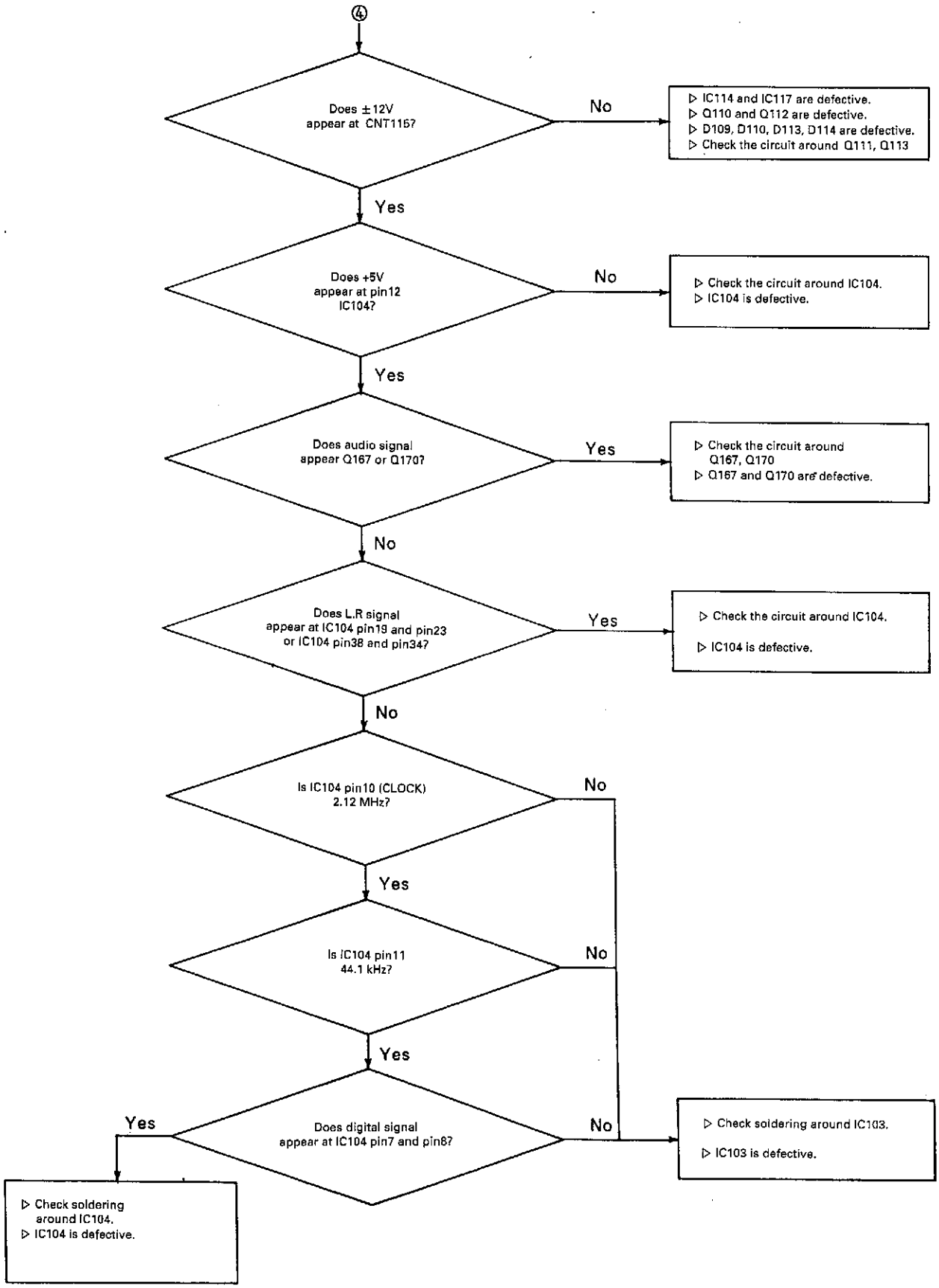


Figure 23

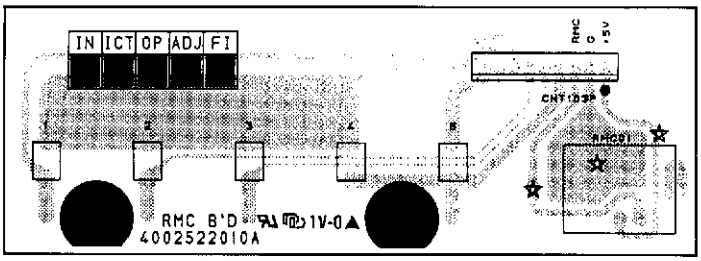
No sound signal.


④
Does ±12V appear at CNT1157
No
▷ IC114 and IC117 are defective.
▷ Q110 and Q112 are defective.
▷ D109, D110, D113, D114 are defective.
▷ Check the circuit around Q111, Q113
Yes
Does +5V appear at pin12 IC104?
No
▷ Check the circuit around IC104.
▷ IC104 is defective.
Yes
Does audio signal appear Q167 or Q170?
Yes
▷ Check the circuit around Q167, Q170
▷ Q167 and Q170 are defective.
No
Does L.R signal appear at IC104 pin19 and pin23 or IC104 pin38 and pin34?
Yes
▷ Check the circuit around IC104.
▷ IC104 is defective.
No
Is IC104 pin10 (CLOCK) 2.12 MHz?
No
Yes
Is IC104 pin11 44.1 kHz?
No
Yes
Does digital signal appear at IC104 pin7 and pin8?
No
▷ Check soldering around IC103.
▷ IC103 is defective.
Yes
▷ Check soldering around IC104.
▷ IC104 is defective.

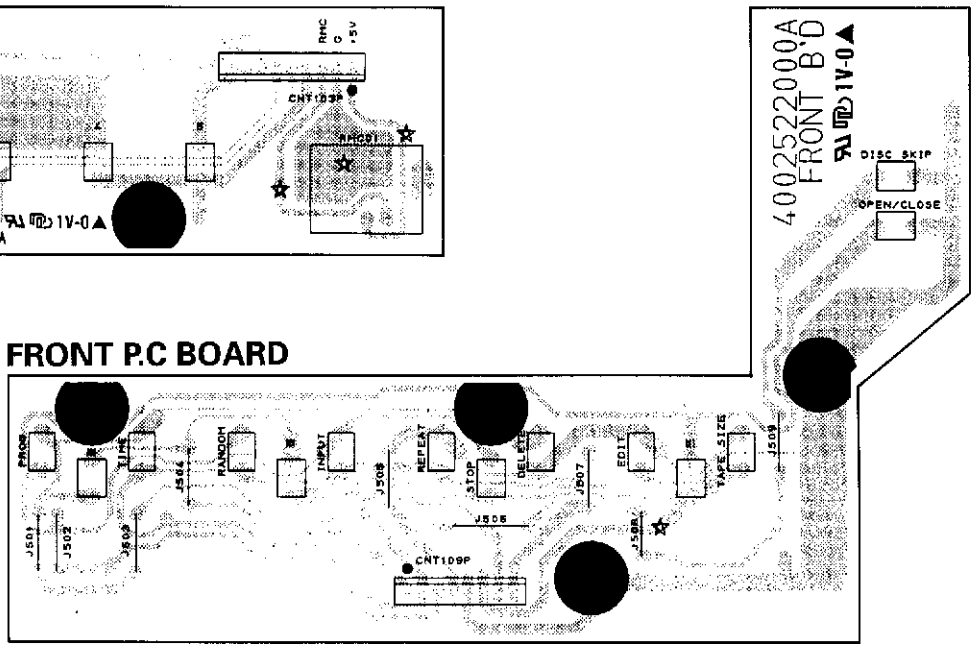
PRINTED CIRCUIT BOARDS

Model No. : FL-8450

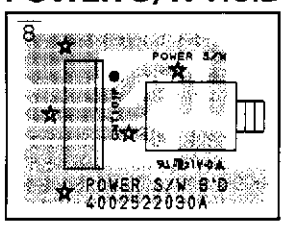
RMC P.C.BOARD



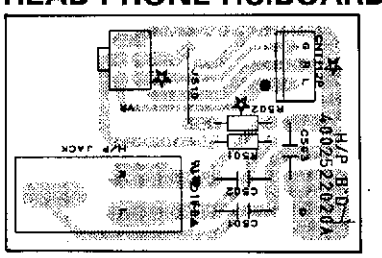
FRONT P.C BOARD



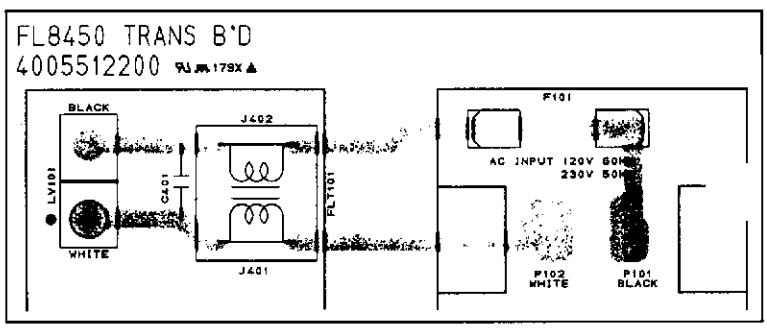
POWER S/W P.C.BOARD



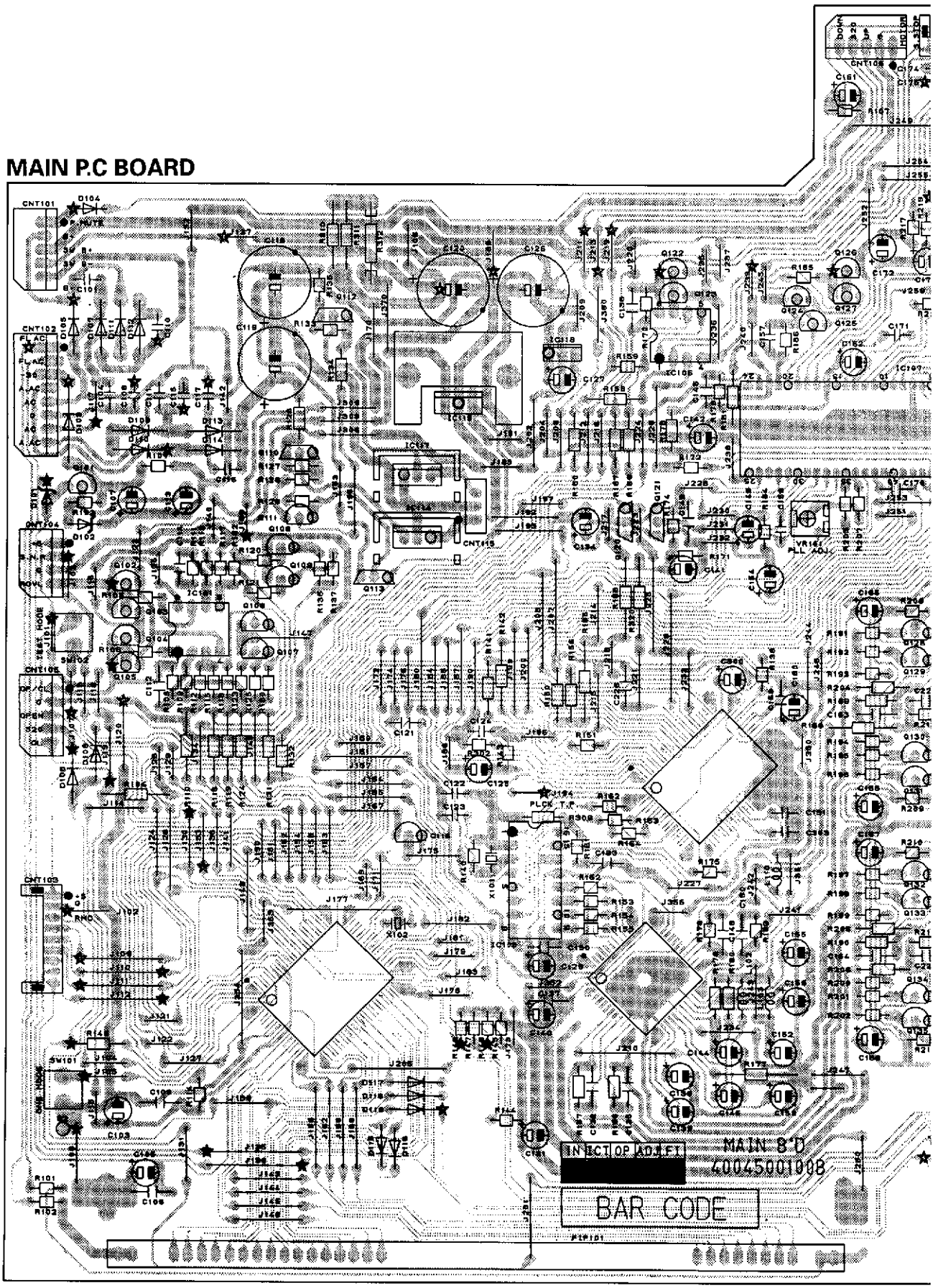
HEAD PHONE P.C.BOARD

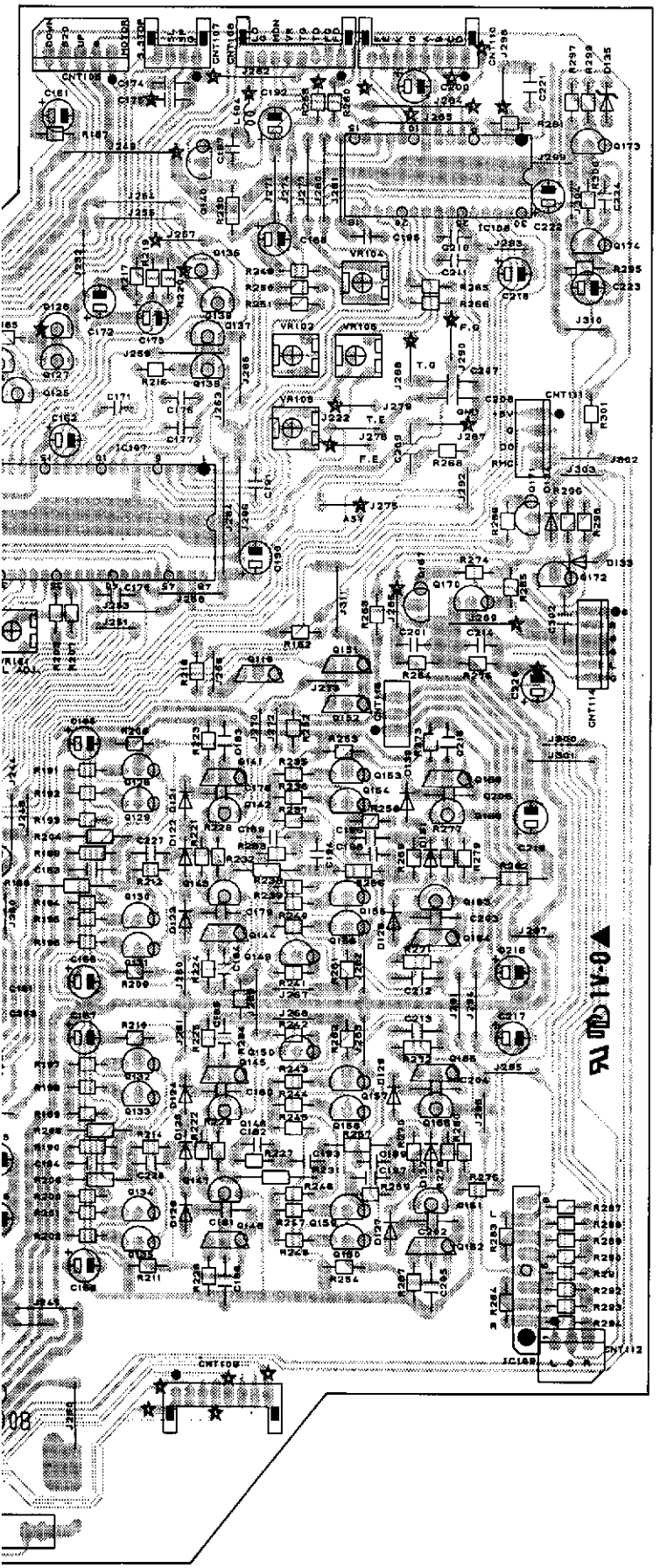


TRANS P.C.BOARD

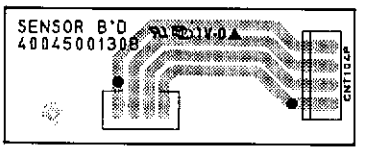


MAIN P.C BOARD

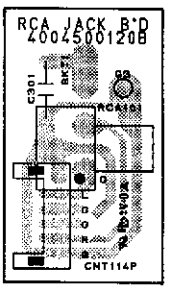




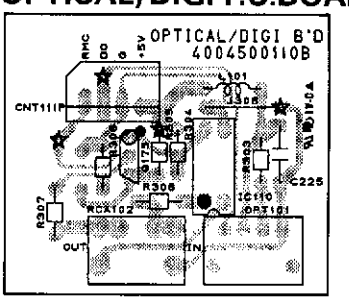
SENSORA P.C.BOARD



RCA JACK P.C.BOARD

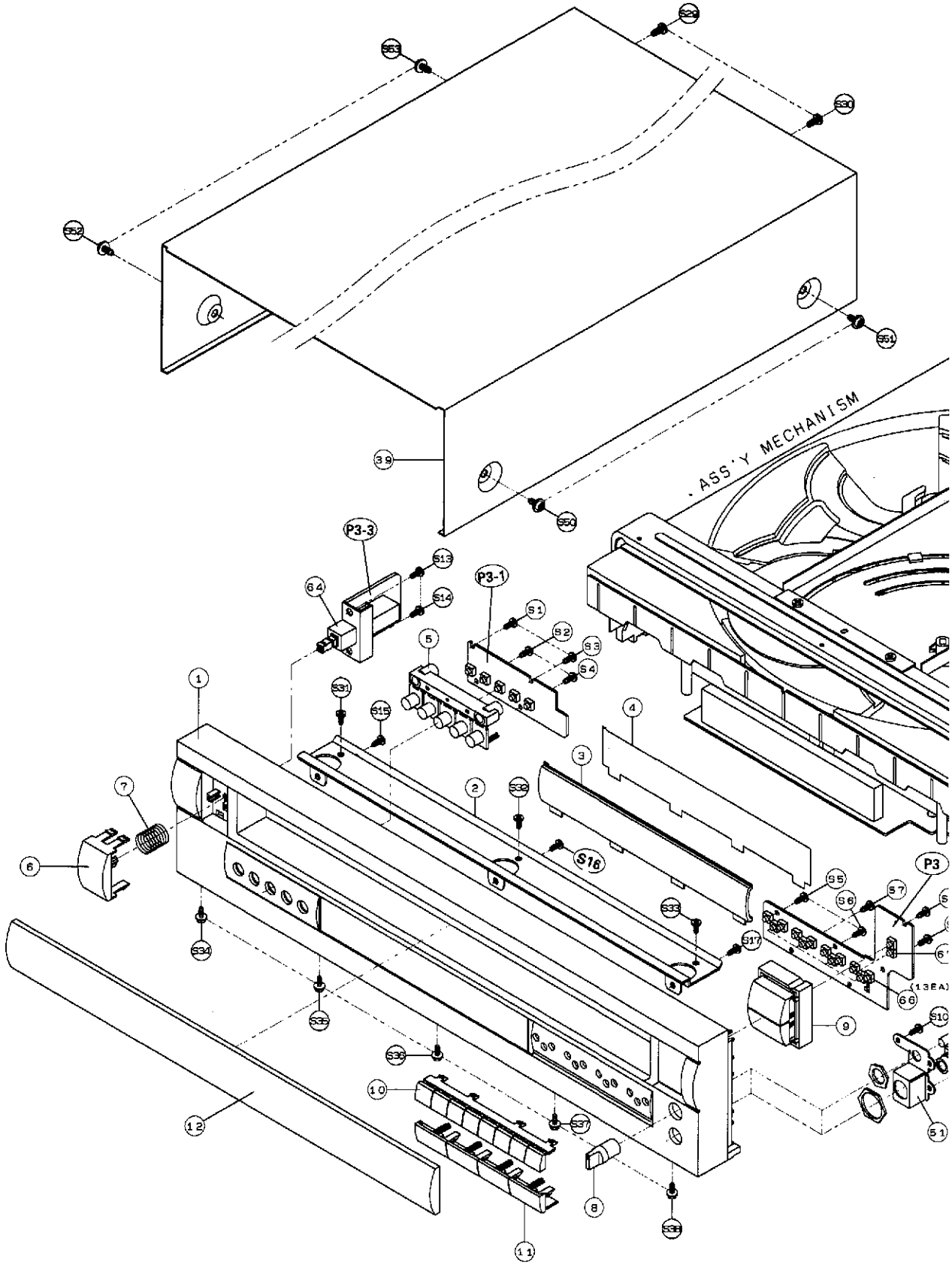


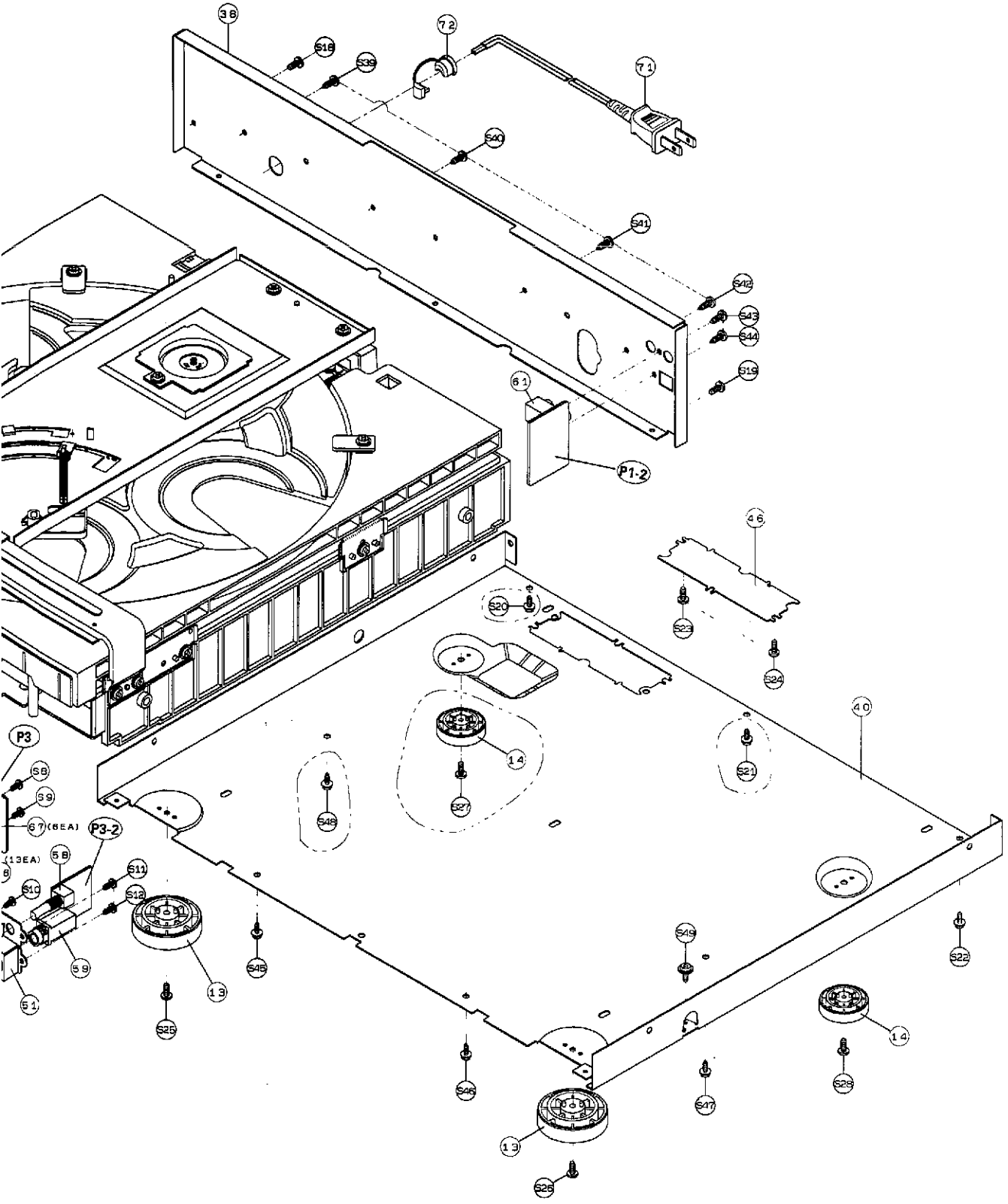
OPTICAL/DIGI P.C.BOARD



GENERAL UNIT EXPLODED VIEW

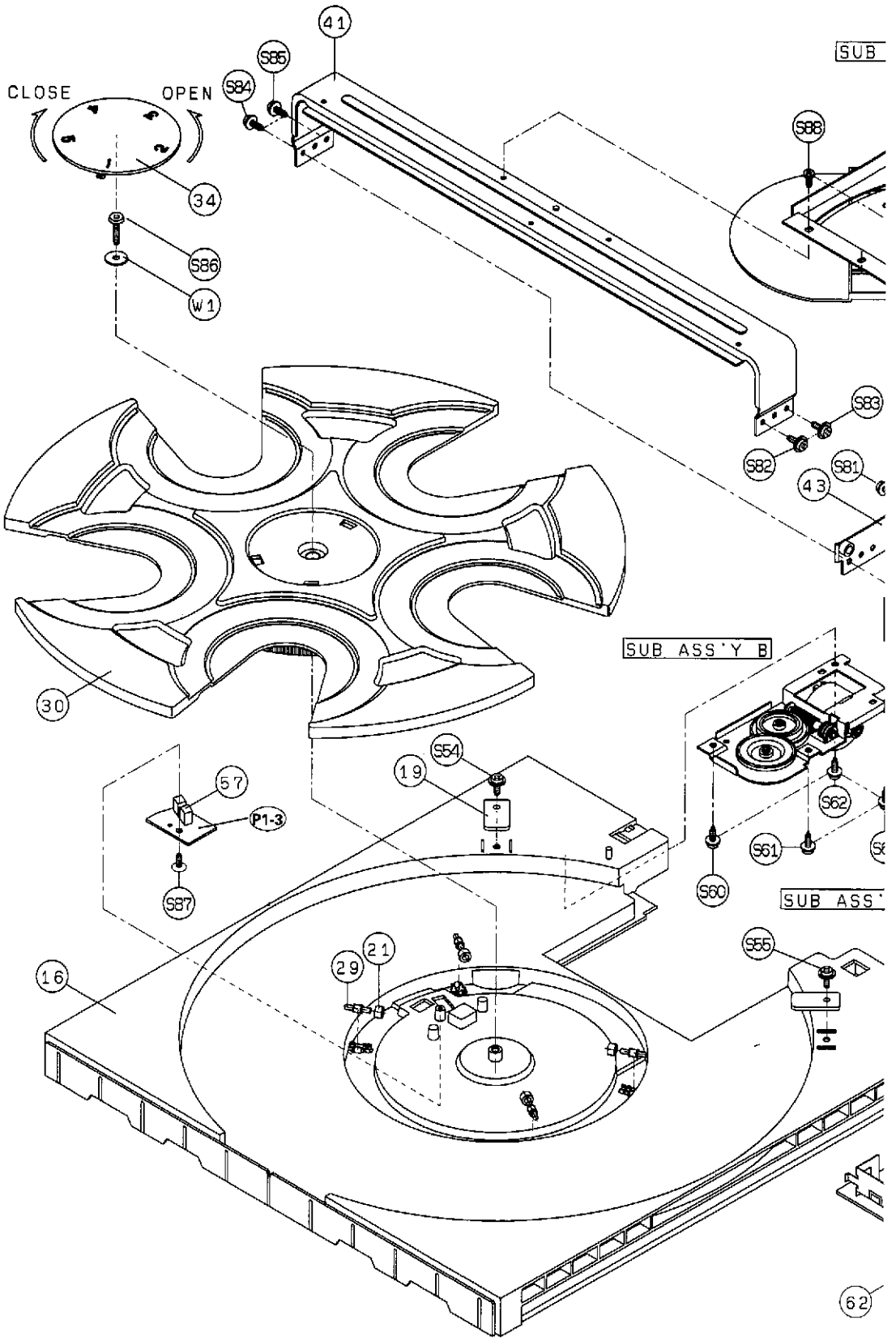
CABINET AND CHASSIS

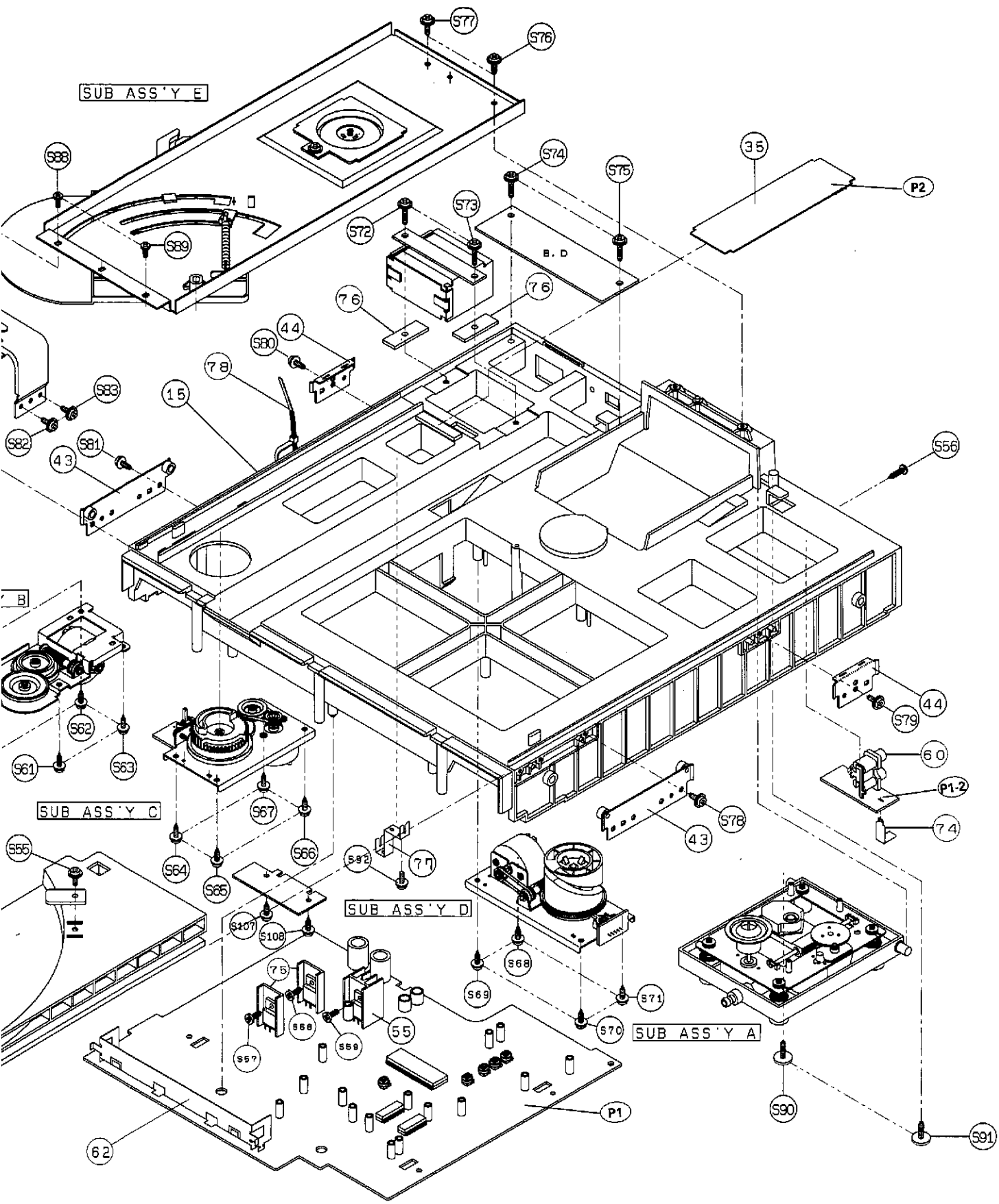



38
72
S39
71
S40
S41
S42
S43
S44
S19
61
P1-2
46
S20
S23
S24
40
14
S27
S48
S21
P3
S8
S9
67(6EA)
P3-2
(13EA)
58
S11
S10
S12
59
51
S25
13
S45
S49
S22
14
S46
S47
S28
13
S26

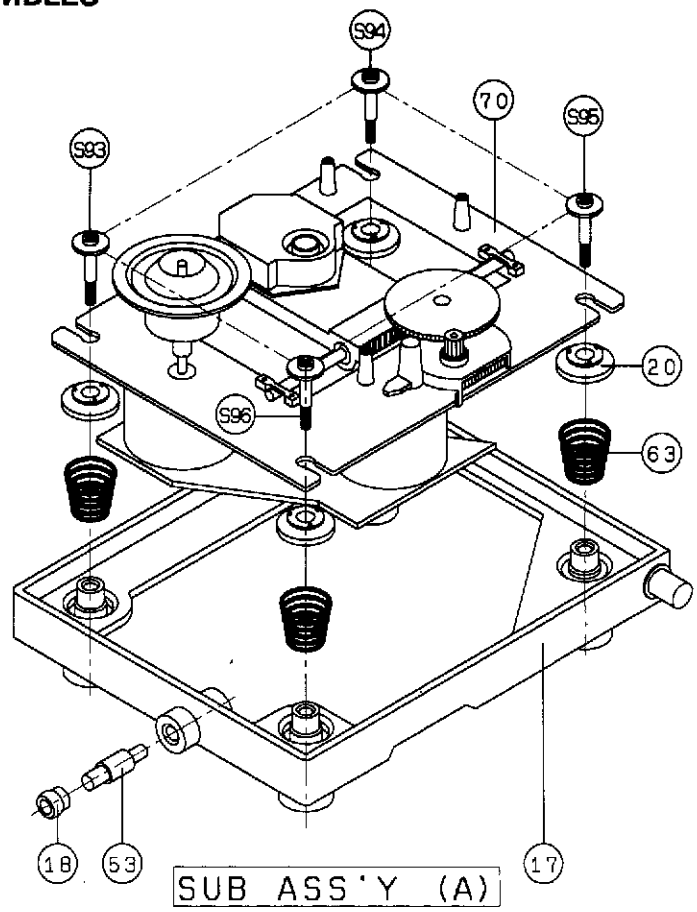
MECHANISM

EXPLODED VIEW OF ASS'Y MECHANISM

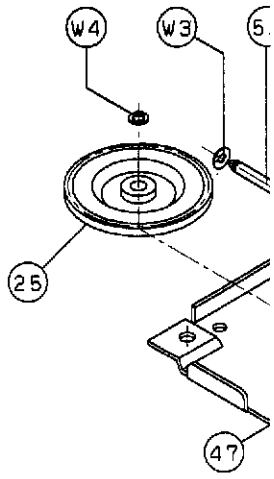



SUB ASS'Y E
SUB ASS'Y B
SUB ASS'Y C
SUB ASS'Y D
SUB ASS'Y A
B. D
S77
S76
S88
S89
S74
S75
35
P2
S73
S72
76
S80
44
78
15
S83
S82
S81
43
S56
S62
S61
S63
S67
S64
S66
S65
S92
77
S107
S108
75
S68
S57
S59
55
S68
S69
S71
S70
62
P1
S79
60
P1-2
74
S78
S55
S90
S91

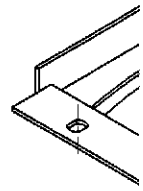
MECHANISM ASSEMBLES

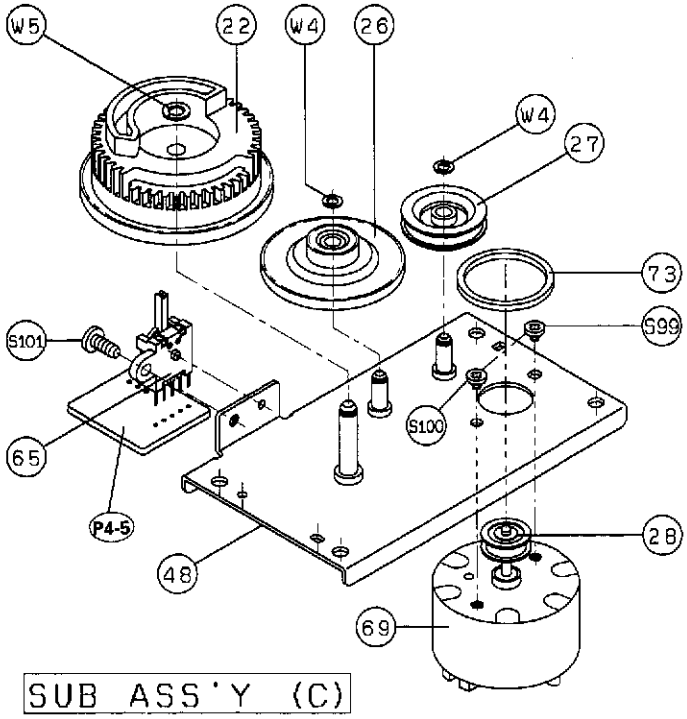


SUB ASS'Y (A)



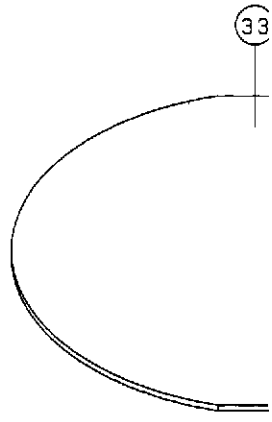
SUB ASS'Y

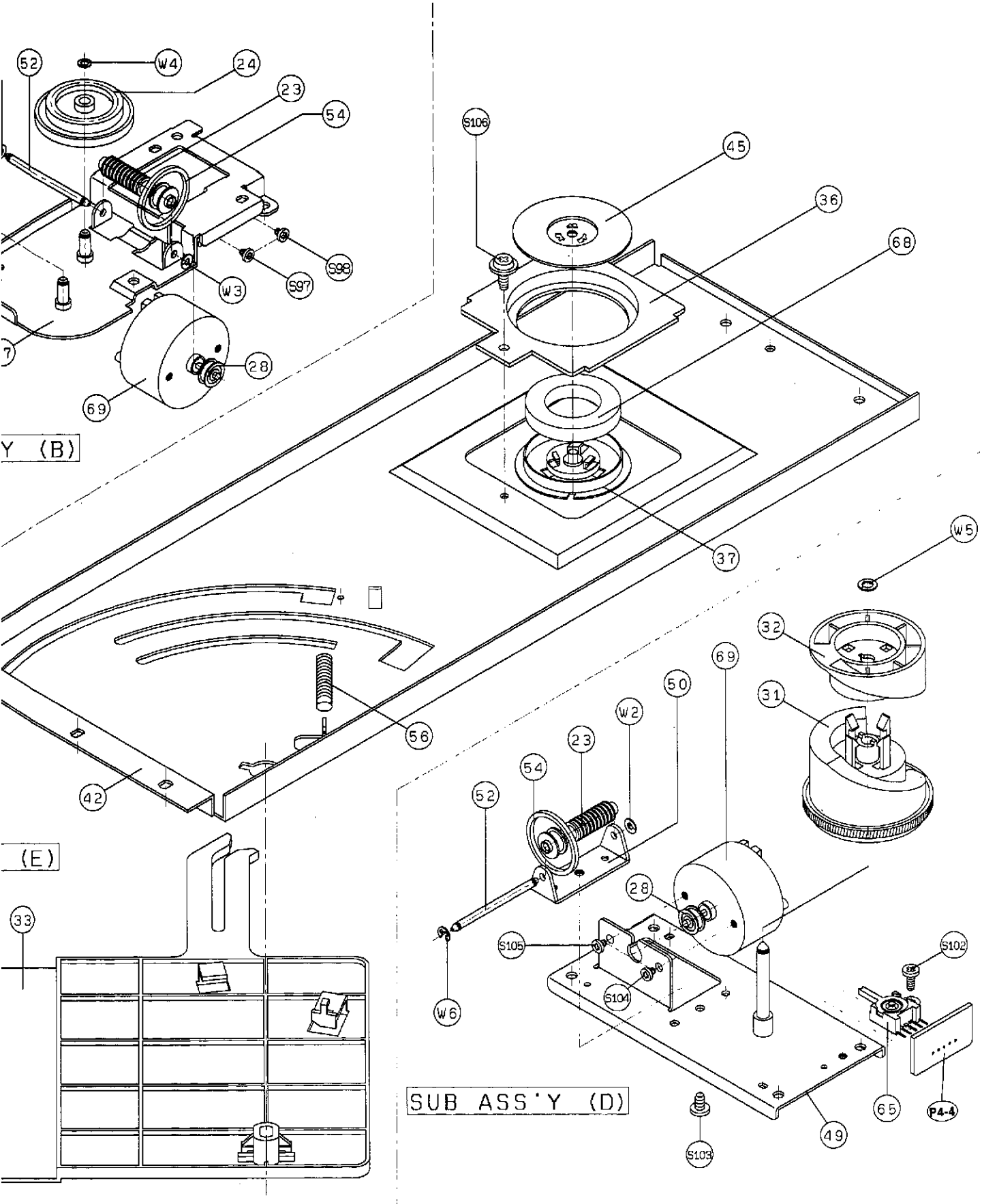




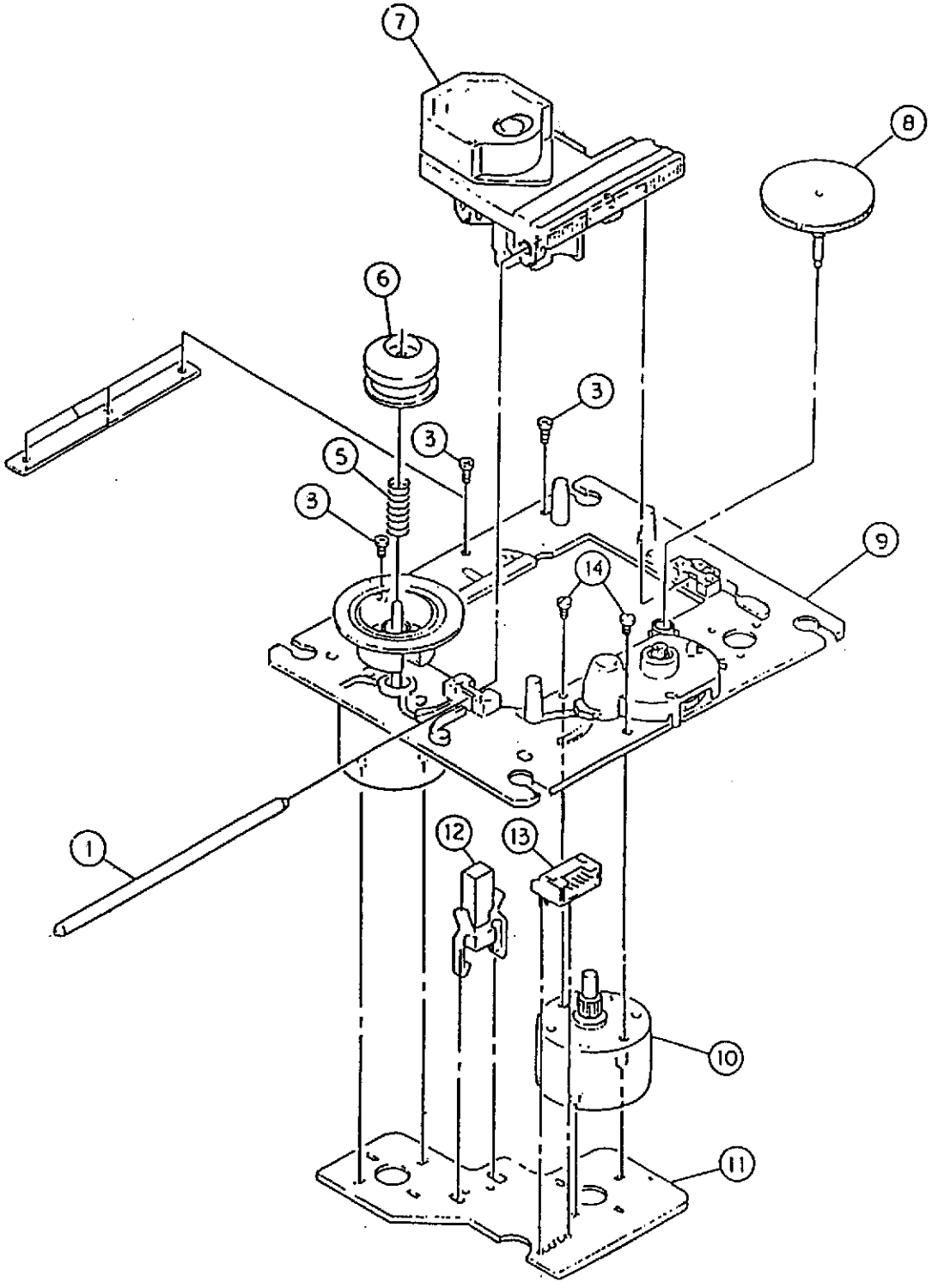
SUB ASS'Y (C)

SUB ASS'Y (




52
W4
24
23
54
S106
45
36
68
S98
S97
W3
28
69
Y (B)
37
W5
32
69
50
31
W2
23
54
52
56
42
(E)
33
28
S105
S102
S104
W6
SUB ASS'Y (D)
65
P4-4
49
S103

CD MECHANISM (KSM-2101A-AM)



GENERAL UNIT PARTS LIST

CABINET & CHASSIS PARTS LIST

Ref. No.	Part No.	Description	Q'ty
		CABINET AND CHASSIS	
8	04854508741	Knob Rotary	1
13	04603310251	Foot (H. S)	2
14	04603510151	Foot Base	1
15	6020600010	Body Mecha	2
16	6020800010	Tray Roulette	4
19	6065104120	Cover Drop	2
21	6715018820	Rubber Roller	4
29	7115003210	Roller Roulette	4
30	7121400220	Roulette	1
34	04858300412	Cover Roulette	1
35	8585006040	Cover Power B'D	1
38	04610204052	Chassis Back	1
39	04612202201	Cover Top	1
40	6121606610	Chassis Main	1
41	6122631530	Frame Body	1
43	6143001120	Guide Tray, F	2
44	6145002120	Guide Tray, B	2
46	6165138410	Cover Fuse	1
71 ⚠	4308001410	AC Cord, EHD-0008-266P, 2000mm, Black	1
76	8585006410	Holder, Trans	2
72	6518000710	Stopper, Cord	4
77	4205003510	Terminal, Lead	1
78	6528002810	Tie, Locking	1
	6725002830	Sponge, Tray, 2t	1
	6725002840	Sponge, Tray, 4t	5
		CONNECT LEAD ASSEMBLIES	
(CNT101)	4358508201	Lead Ass'y 8P, 200 mm, CD mecha to Main B'	1
(CNT102)	4358508202	Lead Ass'y 8P 200 mm, CD mecha to Main B' White and blue	1
(CNT103)	4358504105	Lead Ass'y 4P, 100 mm, CD mecha to Main B'	1
(CNT107)	4358504290	Lead Ass'y 4P 290mm, with tube, yellow, Ass'y Rolett gear to Sensor Motor B'D,	1
S57-S59	8109230061	Screw #2BTC 3x8Y	3
S18-S30	8109230083	Screw #2BTC 3x8B	13
S78-S85	8109230101	Screw #2BTC 3x10Y	8
S86	8109230161	Screw #2BTC 3x16Y	1
S39-S44,S56	8119130123	Screw #1PTC 3x12B	7
S88/S89	8119430051	Screw SAM 3x5Y	2
S87	8129126103	Screw #1FT 2.6x10B	1
S90,S91	8155001210	Screw Mecha	2
S60-S77	8159130121	Screw #1WPTC 3x12Y	18
S45-S48	8159130121	Screw #1WPTC 3x12Y	4
S49,S92	8159230081	Screw #2WPTC 3x8Y	2
S31-S33	8159230083	Screw #2WPTC 3x8B	3
S54/S55	8159230083	Screw #2WPTC 3x8B	2
S37/S38	8159230083	Screw #2WPTC 3x8B	2
S50-S53	8159440083	Screw WSAM 4x8B	4
W1	8305003810	Washer Plain Ø14	1
	05850100200	**ASSEMBLY FRONT PANEL**	
1	04850103302	Panel, Front	1
2	6503030110	Bracket, Support	1
3	8553019410	Window Display	1
4	04855301951	Filter F/L	1
5	04854305851	Button, Display	1
6	04854512331	Button, Power	1
7	6555004360	Spring Button,	1
9	04854512341	Button, Play	1
10	04854305831	Button, Function (A)	1
11	04854305841	Button, Function (B)	1
12	04856200511	Door Tray	2
51	6505137010	Bracket, Phone	1
S10-S17	8109230083	Screw #2BTC 3x8B	17
S34-S36	8159230083	Screw WPTC 3x8B	3

Ref. No.	Part No.	Description	Q'ty
	05570800040	**Sub Ass'y "A", CD mechanism**	
17	6022601810	Base D. U.	1
18	6065105610	Rolling Cap	1
20	6715018420	Rubber Damping	4
53	7005007230	Shaft Base D. U.	1
63	6555009220	Spring Damping	4
70	5708012910	CD Mecha KSM-210A-AM	1
S93-S96	8155001110	Screw Damping	4
	05650000002	**Sub Ass'y "B", Roulette Gear**	
23	7103000910	Worm	1
24	7103001110	Gear Roulette	1
25	7103001210	Gear Idle	1
28	7113001310	Pulley, Motor	1
47	6503019420	Bracket, Roulette	1
52	7005007110	Shaft Worm	1
54	7165002420	Belt, 18x1.5x1.5	1
69	5558200310	Motor RF-500TB-14415	1
S97/S98	8009126031	Screw BM 2.6x3Y	2
W3	8338300710	Poly Washer 2.1x5x0.5	2
W4	8338300810	Poly Washer 2.6x6x0.5	2
P4-2	4002517720	P.C.B Skip Motor	1
CNT107	4428515410	Wafer 4P	1
CNT201	4428505710	Wafer 3P	1
C302	3509222233	Ceramic Disc 0.0022 uF 50 V J	1
R301	3069151970	Cabon Film 150 ohm 1/5 W J	1
R302	3069103970	Cabon Film 10 kohm 1/5 W J	1
	05650000001	**Sub Ass'y "C", Loading Gear**	
CNT104	4358105203	Lead Ass'y 5P 200mm, to Main B'D	1
22	7102000110	Gear Loading	1
26	7103001310	Gear Center	1
27	7103001420	Gear Pulley 2	1
28	7113001310	Pulley, Motor	1
48	6503019520	Bracket, Loading (2)	1
73	7165002210	Belt, 25x1.5x1.5	1
69	5558200310	Motor RF-500TB-14415	1
S99/S100	8009126031	Screw BM 2.6x3Y	2
S101	8009126061	Screw BM 2.6x6Y	1
W4	8338300810	Poly Washer 2.6x6x0.5	2
W5	8338300910	Poly Washer 3.2x6x0.5	1
P4	4002517700	P.C.B Motor	1
65	4638003210	SW Lever, SSCF21028A	1
P4-5	4002517750	P.C.B IN/OUT Leaf	1
	05650000001	**Sub Ass'y "D", Cam Gear**	
CNT108	4358105204	Lead Ass'y 5P 200mm, to Main B'D	1
23	7103000910	Worm	1
28	7113001310	Pulley, Motor	1
31	7142000210	Cam Gear	1
32	7142000310	Cam Cover	1
49	6503019610	Bracket, Cam	1
50	6505105610	Bracket, Worm 2	1
52	7005007110	Shaft Worm	1
54	7165002420	Belt, 18x1.5x1.5	1
69	5558200310	Motor RF-500TB-14415	1
S104/S105	8009126031	Screw BM 2.6x3Y	2
S101	8009126061	Screw BM 2.6x6Y	1
S103	8119430051	Screw SAM 3x5Y	1
W2	8338300610	Poly Washer 2.1x5x0.3	1
W5	8338300910	Poly Washer 3.2x6x0.5	1
W6	8339020011	Washer E-Ring Ø2	1

Ref. No.	Part No.	Description	Q'ty
P4-1	4002517710	P.C.B Chucking	1
65	4638003210	SW Lever, SSCF21028A	1
P4-4	4002517740	P.C.B Up/Down Leaf	1
	05612000000	**Sub Ass'y "E", Chuck**	
33	8582001020	Cover Disc	1
36	6043008410	Guide Chuck	1
37	6063103010	Base Magnet	1
42	6125000120	Chassis, Chuk	1
45	6023408610	Cover, Magnet	1
68	5125000910	Magnet, Ferrite	1
56	6555306110	Spring Cover	1
S106	8119430051	Screw SAM 3x5Y	1
55	7505206150	Heatsink REG TR KA7805	1
57	2408001111	SG-2, Sensor Photo	1
58	3208067210	VR, Level	1
59	4438005010	Jack, Phone, ABS, Gold	1
60	4438103010	Jack RCA 2P	1
61	4438007510	Jack Mini 2P	1
62	6513004420	Holder FIP	1
64	4628055810	SW Push Power	1
66	4658003710	SW Tact, SKHV10910D01	13
66	4658003710	SW Tact, SKHV10910D01	6
67	4658004410	SW Tact, EVQ-PJJ-05T	5
74	6505139410	Bracket, Ground	1
75	7505202410	Heatsink REG TR KA7812	1
75	7505202410	Heatsink REG TR KA7912	1

CD MECHANISM (KSM-2101A-AM)

Ref. No.	Part No.	Description	Q'ty
1	5798900002	Shaft, Slide	1
3/4		Not Used.	
5	5798900003	Spring T/T	1
6	5798900004	Centering L/O	1
7	5798900001	Pick-up, KSS-210A (S)-RP	1
8	5798900005	Gear A	1
9	5798900006	T/T Chassis Assembly (MT)	1
10	5798900007	Motor Gear Assembly (MT)	1
11	5798900008	P.C.B Motor	1
12	5798900009	Switch, Leaf	1
13	5798900010	Wafer 4P	1
14	8019120031	Screw PM 2x3 ZNY	1

The following parts are only for European version.

Ref. No.	Part No.	Description	Q'ty
38	046102043021	Chassis Back	1
72	6518000111	Stopper, Cord	4
71 ⚠	4308000430	AC Cord, EHD-0008-266P, 2000mm, Black	1

PRODUCT SAFETY NOTICE

Each precaution in this manual should be follower during servicing. Components identified with the IEC symbol ⚠ in the parts list and the safety can be of special significance. When replacing a component identified with ⚠ , use only the replacement parts designated, or parts with the same ratings of resistance, wattage or voltage that are designated in the parts list in this manual. Leakage-current or resistance measurements must be made to determine that exposed parts are acceptably insulated from the supply circuit before returing the product to the customer.

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SOME OF THE 12 DIGIT PART NUMBERS
ARE MISSING THE LAST DIGIT. THEY
CAN BE CORRECTED BY USING THIS SHEET

The followings are the full parts number for summary of 12-digit parts number.

Ref #	Parts number	description	Q'ty per unit	Remark
8	048545087411	Knob Rotary	1	
13	046033102511	Foot (H.S)	2	
14	046035101511	Foot Base	1	
34	048583004121	Cover Roulette	1	
38	046102040521	Chassis Back	1	120V only
39	046122022011	Cover Top	1	
	048501002000	Assembly Front Panel		
1	048501033021	Panel, Front	1	
4	048553019511	Filter F/L	1	
5	048543058511	Button, Display	1	
6	048545123312	Button, Power	1	
9	048545123412	Button,Play	1	
10	048543058312	Button, Function (A)	1	
11	048543058412	Button, Function (B)	1	
12	048562005112	Door, Tray	2	
	055708000408	Sub Ass'y "A", CD Mechanism		
	056500000025	Sub Ass'y "B", Roulette Gear		
	056500000016	Sub Ass'y "C", Loading Gear		
	056500000017	Sub Ass'y "D", Cam Gear		
	056120000008	Sub Ass'y "E", Chuck		
38	046102043021	Chassis Back	1	230V only

ELECTRICAL PARTS LIST

PRODUCT SAFETY NOTICE: Products marked with ⚠ have special characteristics important to safety.
If you replace of these components, read carefully the product safety notice in this manual.
Don't degrade the safety of the product though improper servicing.
Resistor/Capacitor Tolerance, D: (±0.5%), J: (±5%), K: (±10%), M: (±20%), Z: (+80, -20%).

Ref. No.	Part No.	Description				Q'ty
P1	054002008030	**ASS'Y P.C.B MAIN**				1
		Miscellaneous				
55	7505206150	Heatsink REG TR KA7805				1
75	7505202410	Heatsink REG TR KA7812				1
75	7505202410	Heatsink REG TR KA7912				1
62	6513004420	Holder FIP				1
		Switches				
SW101	4658003710	SW Tact, SKHV10910D01				1
SW102	4658003710	SW Tact, SKHV10910D01				1
		Capacitors				
C101	3679103120	Mylar	0.01 uF	100V	J	1
C103	3479310121	Electrolytic SG	100 uF	10V	M	1
C104	3679103120	Mylar	0.01 uF	100V	J	1
C105	3479347061	Electrolytic SG	47 uF	35V	M	1
C106	3519223935	Ceramic tubular	0.022 uF	50V	J	1
C107 ⚠	3479347071	Electrolytic SG	47 uF	50V	M	1
C108	3679103120	Mylar	0.01 uF	100V	J	1
C109 ⚠	3519104935	Ceramic tubular	0.1 uF	16V	F	1
C110/C111	3679103120	Mylar	0.01 uF	100V	J	2
C112	3519471935	Ceramic tubular	470 pF	50V	J	1
C113	3479347071	Electrolytic SG	47 uF	50V	M	1
C114	3519471935	Ceramic tubular	470 pF	50V	J	1
C115-C117	3679103120	Mylar	0.01 uF	100V	J	3
C118/C119	3409310249	Electrolytic SG	1000 uF	25V	M	2
C120 ⚠	3409322249	Electrolytic SG	2200 uF	16V	M	1
C121	3519102935	Ceramic tubular	0.001 uF	50V	J	1
C122/C123	3529220210	Ceramic Disc(CH)	22 pF	50V	J	2
C124	3679333120	Mylar	0.033 uF	100V	J	1
C125	3479347871	Electrolytic SG	0.47 uF	50V	M	1
C125 ⚠	3409322249	Electrolytic SG	2200 uF	16V	M	1
C127	3479310971	Electrolytic SG	1 uF	50V	M	1
C129	3479310121	Electrolytic SG	100 uF	10V	M	1
C130	3519223935	Ceramic tubular	0.022 uF	50V	J	1
C131	3479333971	Electrolytic SG	3.3 uF	50V	M	1
C132	3519101935	Ceramic tubular	100 pF	50V	J	1
C133	3519220935	Ceramic tubular	22 pF	50V	J	1
C134	3479310971	Electrolytic SG	1 uF	50V	M	1
C135	3519101935	Ceramic tubular	100 pF	50V	J	1
C136	3519471935	Ceramic tubular	470 pF	50V	J	1
C137	3519223935	Ceramic tubular	0.022 uF	50V	J	1
C138/C139	3479347041	Electrolytic SG	47 uF	25V	M	2
C140	3479322131	Electrolytic SG	220 uF	16V	M	1
C141	3479310071	Electrolytic SG	10 uF	50V	M	1
C142	3479310121	Electrolytic SG	100 uF	10V	M	1
C143	3519103915	Ceramic tubular	0.01 uF	16V	J	1
C144/C145	3479347041	Electrolytic SG	47 uF	25V	M	2
C146	3519472915	Ceramic tubular	4700 pF	16V	J	1
C148	3519101935	Ceramic tubular	100 pF	50V	J	1
C149	3479347971	Electrolytic SA	4.7 uF	50V	J	1
C150	3519101935	Ceramic tubular	100 pF	50V	J	1
C151	3579220130	Ceramic Disc	22 pF	50V	J	1
C152-C154	3479310121	Electrolytic SG	100 uF	10V	M	3
C155/C156	3479347041	Electrolytic SG	47 uF	25V	M	2
C157	3679153120	Mylar	0.015 uF	100V	J	1
C158	3679472120	Mylar	0.005 uF	100V	J	1
C159	3519223935	Ceramic tubular	0.022 uF	50V	J	1
C160	3479310121	Electrolytic SG	100 uF	10V	M	1
C161	3479310071	Electrolytic SG	10 uF	50V	M	1
C162	3479333971	Electrolytic SG	3.3 uF	50V	M	1
C163/C164	3519101935	Ceramic tubular	100 pF	50V	J	2
C165-C168	3479310141	Electrolytic SG	100 uF	25V	M	4
C170	3519102935	Ceramic tubular	0.001 uF	50V	J	1
C171	3679104122	Mylar	0.1 uF	100V	J	1
C172	3479322071	Electrolytic SG	22 uF	50V	M	1
C173	3479333971	Electrolytic SG	3.3 uF	50V	M	1
C174/C175	3519561935	Ceramic tubular	560 pF	50V	J	2
C176	3679104122	Mylar	0.1 uF	100V	J	1
C177	3679473120	Mylar	0.047 uF	100V	J	1
C178-C181	3519100935	Ceramic tubular	10 pF	50V	J	4
C182	3679562120	Mylar	0.006 uF	100V	J	1
C183-C186	3519221935	Ceramic tubular	220 pF	50V	J	4
C187	3679222120	Mylar	0.002 uF	100V	J	1
C188	3479310121	Electrolytic SG	100 uF	10V	M	1
C189	3679562120	Mylar	0.006 uF	100V	J	1
C190	3479310121	Electrolytic SG	100 uF	10V	M	1
C191	3679222120	Mylar	0.002 uF	100V	J	1
C192	3479310121	Electrolytic SG	100 uF	10V	M	1
C193-C195	3679333120	Mylar	0.033 uF	100V	J	3
C196/C197	3519121935	Ceramic tubular	120 pF	50V	J	2
C198/C199	3679122120	Mylar	0.001 uF	100V	J	2
C200	3479310121	Electrolytic SG	100 uF	10V	M	1
C201	3679153120	Mylar	0.015 uF	100V	J	1
C202-C204	3519100935	Ceramic tubular	10 pF	50V	J	3
C205	3519470935	Ceramic tubular	47 pF	50V	J	1
C206	3519100935	Ceramic tubular	10 pF	50V	J	1
C207	3519561935	Ceramic tubular	560 pF	50V	J	1
C208	3519472915	Ceramic tubular	4700 pF	16V	J	1
C209	3679103120	Mylar	0.01 uF	100V	J	1
C210	3679333120	Mylar	0.033 uF	100V	J	1
C211	3679103120	Mylar	0.01 uF	100V	J	1
C212/C213	3519470935	Ceramic tubular	47 pF	50V	J	2
C214	3679153120	Mylar	0.015 uF	100V	J	1
C215	3519470935	Ceramic tubular	47 pF	50V	J	1
C216/C217	3479322141	Electrolytic SG	220 uF	25V	M	2
C218	3479347871	Electrolytic SG	0.47 uF	50V	M	1
C219/C220	3479310071	Electrolytic SG	10 uF	50V	M	2
C221	3519103915	Ceramic tubular	0.01 pF	16 V	J	1
C222	3479310121	Electrolytic SG	100 uF	10V	M	1
C223	3479347871	Electrolytic SG	0.47 uF	50V	M	1
C224	3679222120	Mylar	0.002 uF	100V	J	1
C226	3519223935	Ceramic tubular	0.022 uF	50V	J	1
C227/C228	3519101935	Ceramic tubular	100 pF	50V	J	2
C300	3479310071	Electrolytic SG	10 uF	50V	M	1
C302	3519473935	Ceramic tubular	0.047 uF	50V	J	1
C601	3519104935	Ceramic tubular	0.1 uF	50V	F	1
C602	3519223935	Ceramic tubular	0.022 uF	50V	J	1
C603	3519102935	Ceramic tubular	0.001 uF	50V	J	1
C604	3519104935	Ceramic tubular	0.1 uF	50V	F	1
		Resistors				
R101/R102	3069339970	Carbon Film	3.3 ohm	1/5W	J	1
R103	3069472970	Carbon Film	4.7 Kohm	1/5W	J	1
R104	3069473970	Carbon Film	47 Kohm	1/5W	J	1
R105/R106	3069100970	Carbon Film	10 ohm	1/5W	J	2
R107	3069103970	Carbon Film	10 Kohm	1/5W	J	1
R108	3069154970	Carbon Film	150 Kohm	1/5W	J	1
R109	3069104970	Carbon Film	100 Kohm	1/5W	J	1
R110	3069103970	Carbon Film	10 Kohm	1/5W	J	1
R111	3069104970	Carbon Film	100 Kohm	1/5W	J	1
R112	3069154970	Carbon Film	150 Kohm	1/5W	J	1
R113	3069104970	Carbon Film	100 Kohm	1/5W	J	1
R114	3069473970	Carbon Film	47 Kohm	1/5W	J	1
R115	3069104970	Carbon Film	100 Kohm	1/5W	J	1
R116	3069512970	Carbon Film	5.1 Kohm	1/5W	J	1
R117	3069104970	Carbon Film	100 Kohm	1/5W	J	1
R118-R121	3069512970	Carbon Film	5.1 Kohm	1/5W	J	4
R122	3069104970	Carbon Film	100 Kohm	1/5W	J	1
R123-R125	3069512970	Carbon Film	5.1 Kohm	1/5W	J	3
R126	3069229970	Carbon Film	2.2 ohm	1/5W	J	1
R127	3069103970	Carbon Film	10 Kohm	1/5W	J	1
R128	3069222970	Carbon Film	2.2 Kohm	1/5W	J	1
R129	3069473970	Carbon Film	47 Kohm	1/5W	J	1
R130/R131	3069512970	Carbon Film	5.1 Kohm	1/5W	J	2
R132/R133	3069103970	Carbon Film	10 Kohm	1/5W	J	2
R134	3069222970	Carbon Film	2.2 Kohm	1/5W	J	1
R135	3069339970	Carbon Film	3.3 ohm	1/5W	J	1
R136/R137	3069512970	Carbon Film	5.1 Kohm	1/5W	J	2
R138	3069102970	Carbon Film	1 Kohm	1/5W	J	1
R140	3069105970	Carbon Film	1 Mohm	1/5W	J	1

Ref. No.	Part No.	Description	Q'ty
R141	3069102970	Carbon Film 1 Kohm 1/5W J	1
R142	3069103970	Carbon Film 10 Kohm 1/5W J	1
R143	3069105970	Carbon Film 1 Mohm 1/5W J	1
R144	3069332970	Carbon Film 3.3 Kohm 1/5W J	1
R145-R148	3069104970	Carbon Film 100 Kohm 1/5W J	4
R149	3069102970	Carbon Film 1 Kohm 1/5W J	1
R150/R151	3069104970	Carbon Film 100 Kohm 1/5W J	2
R152-R155	3069681970	Carbon Film 680 ohm 1/5W J	4
R156	3069104970	Carbon Film 100 Kohm 1/5W J	1
R157	3069273970	Carbon Film 27 Kohm 1/5W J	1
R158	3069472970	Carbon Film 4.7 Kohm 1/5W J	1
R159	3069104970	Carbon Film 100 Kohm 1/5W J	1
R160	3069103970	Carbon Film 10 Kohm 1/5W J	1
R161-R164	3069681970	Carbon Film 680 ohm 1/5W J	4
R165	3069472970	Carbon Film 4.7 Kohm 1/5W J	1
R166	3069273970	Carbon Film 27 Kohm 1/5W J	1
R167	3069753970	Carbon Film 75 Kohm 1/5W J	1
R168	3069103970	Carbon Film 10 Kohm 1/5W J	1
R169/R170	3069104970	Carbon Film 100 Kohm 1/5W J	2
R171	3069223970	Carbon Film 22 Kohm 1/5W J	1
R172	3069473970	Carbon Film 47 Kohm 1/5W J	1
R173	3069104970	Carbon Film 100 Kohm 1/5W J	1
R174	3069102970	Carbon Film 1 Kohm 1/5W J	1
R175	3069681970	Carbon Film 680 ohm 1/5W J	1
R176	3069273970	Carbon Film 27 Kohm 1/5W J	1
R177	3069223970	Carbon Film 22 Kohm 1/5W J	1
R178	3069101970	Carbon Film 100 ohm 1/5W J	1
R179	3069474970	Carbon Film 470 Kohm 1/5W J	1
R180	3069101970	Carbon Film 100 ohm 1/5W J	1
R181	3069822970	Carbon Film 8.2 Kohm 1/5W J	1
R182	3069223970	Carbon Film 22 Kohm 1/5W J	1
R183	3069273970	Carbon Film 27 Kohm 1/5W J	1
R184	3069104970	Carbon Film 100 Kohm 1/5W J	1
R185	3069332970	Carbon Film 3.3 Kohm 1/5W J	1
R186	3069124970	Carbon Film 120 Kohm 1/5W J	1
R187	3069104970	Carbon Film 100 Kohm 1/5W J	1
R188-R190	3069203970	Carbon Film 20 Kohm 1/5W J	3
R191/R192	3069100970	Carbon Film 10 ohm 1/5W J	2
R193/R194	3069123970	Carbon Film 12 Kohm 1/5W J	2
R195-R198	3069100970	Carbon Film 10 ohm 1/5W J	4
R199/R200	3069123970	Carbon Film 12 Kohm 1/5W J	2
R201/R202	3069100970	Carbon Film 10 ohm 1/5W J	2
R203	3069124970	Carbon Film 120 Kohm 1/5W J	1
R204-R206	3069203970	Carbon Film 20 Kohm 1/5W J	3
R207	3069362970	Carbon Film 3.6 Kohm 1/5W J	1
R208-R211	3069272970	Carbon Film 2.7 Kohm 1/5W J	4
R212	3069203970	Carbon Film 20 Kohm 1/5W J	1
R214	3069203970	Carbon Film 20 Kohm 1/5W J	1
R216	3069154970	Carbon Film 150 Kohm 1/5W J	1
R217	3069153970	Carbon Film 15 Kohm 1/5W J	1
R218	3069332970	Carbon Film 3.3 Kohm 1/5W J	1
R219/R220	3069823970	Carbon Film 82 Kohm 1/5W J	2
R221/R222	3069330970	Carbon Film 33 ohm 1/5W J	2
R223-R226	3069151970	Carbon Film 150 ohm 1/5W J	4
R227	3069391970	Carbon Film 390 ohm 1/5W J	1
R228/R229	3069330970	Carbon Film 33 ohm 1/5W J	2
R230	3069220970	Carbon Film 22 ohm 1/5W J	1
R231/R232	3069122970	Carbon Film 1.2 Kohm 1/5W J	2
R233	3069391970	Carbon Film 390 ohm 1/5W J	1
R234	3069563970	Carbon Film 56 Kohm 1/5W J	1
R235/R236	3069390970	Carbon Film 39 ohm 1/5W J	2
R237/R238	3069123970	Carbon Film 12 Kohm 1/5W J	2
R239/R240	3069390970	Carbon Film 39 ohm 1/5W J	2
R241/R242	3069562970	Carbon Film 5.6 Kohm 1/5W J	2
R243/R244	3069390970	Carbon Film 39 ohm 1/5W J	2
R245/R246	3069123970	Carbon Film 12 Kohm 1/5W J	2
R247/R248	3069390970	Carbon Film 39 ohm 1/5W J	2
R249	3069223970	Carbon Film 22 Kohm 1/5W J	1
R250/R251	3069103970	Carbon Film 10 Kohm 1/5W J	2
R252	3069563970	Carbon Film 56 Kohm 1/5W J	1
R253/R254	3069362970	Carbon Film 3.6 Kohm 1/5W J	2
R255	3069101970	Carbon Film 100 ohm 1/5W J	1
R256/R257	3069203970	Carbon Film 20 Kohm 1/5W J	2
R258/R259	3069512970	Carbon Film 5.1 Kohm 1/5W J	2
R260	3069102970	Carbon Film 1 Kohm 1/5W J	1
R261/R262	3069362970	Carbon Film 3.6 Kohm 1/5W J	2
R263	3069473970	Carbon Film 47 Kohm 1/5W J	1
R264	3069103970	Carbon Film 10 Kohm 1/5W J	1
R265/R266	3069472970	Carbon Film 4.7 Kohm 1/5W J	2

Ref. No.	Part No.	Description	Q'ty
R267	3069221970	Carbon Film 220 ohm 1/5W J	1
R268	3069104970	Carbon Film 100 Kohm 1/5W J	1
R269/R270	3069273970	Carbon Film 27 Kohm 1/5W J	2
R271-R273	3069221970	Carbon Film 220 ohm 1/5W J	3
R274	3069102970	Carbon Film 1 Kohm 1/5W J	1
R275	3069103970	Carbon Film 10 Kohm 1/5W J	1
R276	3069101970	Carbon Film 100 ohm 1/5W J	1
R277-R280	3069330970	Carbon Film 33 ohm 1/5W J	3
R281	3069243970	Carbon Film 24 Kohm 1/5W J	1
R282	3069101970	Carbon Film 100 ohm 1/5W J	1
R283/R284	3069103970	Carbon Film 10 Kohm 1/5W J	2
R285	3069102970	Carbon Film 1 Kohm 1/5W J	1
R286	3069103970	Carbon Film 10 Kohm 1/5W J	1
R287	3069220970	Carbon Film 22 ohm 1/5W J	1
R288	3069183970	Carbon Film 18 Kohm 1/5W J	1
R289	3069273970	Carbon Film 2.7 Kohm 1/5W J	1
R290	3069103970	Carbon Film 10 Kohm 1/5W J	1
R291	3069183970	Carbon Film 18 Kohm 1/5W J	1
R292	3069103970	Carbon Film 10 Kohm 1/5W J	1
R293	3069273970	Carbon Film 2.7 Kohm 1/5W J	1
R294	3069220970	Carbon Film 22 ohm 1/5W J	1
R295	3069473970	Carbon Film 47 Kohm 1/5W J	1
R296	3069183970	Carbon Film 18 Kohm 1/5W J	1
R297	3069102970	Carbon Film 1 Kohm 1/5W J	1
R298	3069153970	Carbon Film 15 Kohm 1/5W J	1
R299	3069102970	Carbon Film 1 Kohm 1/5W J	1
R300	3069102970	Carbon Film 1 Kohm 1/5W J	1
R301	3069103970	Carbon Film 10 Kohm 1/5W J	1
R302	3069203970	Carbon Film 20 Kohm 1/5W J	1
R309	3069100970	Carbon Film 10 ohm 1/5W J	1
R310	3069109970	Carbon Film 1 ohm 1/5W J	1
R311	3069109970	Carbon Film 1 ohm 1/5W J	1
R312	3029109472	Metal Film 1 ohm 1 W J	1
R320	3069102970	Carbon Film 1 Kohm 1/5W J	1
		Variable Resistors	
VR101	3248010243	Semi, 1k, PLL	1
VR102	3248050343	Semi, 50k, Focus Bias	1
VR103	3248020343	Semi, 20k, Focus Gain	1
VR104	3248020343	Semi, 20k, EF Balance	1
VR105	3248020343	Semi, 20k, Tracking Gain	1
		Diodes	
D101	2258599107	Zener, UZ 9.1 BSC, Rectifier	1
D102	2258599128	Zener, UZ 30 BSD, Rectifier	1
⚠ D103	2258100135	1N4002, Rectifier	1
D104	2058322101	1N4148N, Rectifier (=2058306101)	1
⚠ D105	2258100135	1N4002, Rectifier	1
D106	2058322101	1N4148N, Switching (=2058306101)	1
⚠ D107	2258100135	1N4002, Rectifier	1
D108	2058322101	1N4148N, Switching (=2058306101)	1
⚠ D109-D114	2258100135	1N4002, Rectifier	5
D115-D119	2058322101	1N4148N, Switching (=2058306101)	5
D121-D132	2058322101	1N4148N, Biasing (=2058306101)	12
D133	2058322101	1N4148N, Muting (=2058306101)	1
D134	2058322101	1N4148N, Switching (=2058306101)	1
D135	2258599102	Zener, UZ 4.3 BSB, Rectifier	1
		Transistors	
Q101/Q102	2208206113	MPSA56, PNP	2
Q103/Q104	2208606114	MPSA06, NPN	2
Q105	2208206113	MPSA56, PNP	1
Q106-Q109	2208606104	KTC1815Y/KTC3198Y, NPN	4
Q110	2228106107	KTA1023, PNP	1
Q111	2208206105	KTA1015Y/KTA1266Y, PNP	1
Q112	2228406120	KTC1027, NPN	1
Q113	2208622106	DTC114Y, NPN	1
Q116	2208606112	2SD1302S, NPN	1
Q119-Q121	2208622109	DTC144E, NPN	3
Q122	2208606114	MPSA06, NPN	1
Q123/Q124	2208206113	MPSA56, PNP	2
Q125/Q126	2208606114	MPSA06, NPN	2
Q127	2208206113	MPSA56, PNP	1
Q128/Q129	2208206104	KTA1268 BL, PNP	2
Q130/Q131	2208606108	KTC3200 BL, NPN	2
Q132/Q133	2208206104	KTA1268 BL, PNP	2
Q134/Q135	2208606108	KTC3200 BL, NPN	2
Q136/Q137	2208606114	MPSA06, NPN	2
Q138/Q139	2208206113	MPSA56, PNP	2

Ref. No.	Part No.	Description	Q'ty
Q140	2208206105	KTA1015Y/KTA1266Y, PNP	1
Q141	2228406120	KTC1027, NPN	1
Q142	2208206113	MPSA56, PNP	1
Q143	2208606114	MPSA06, NPN	1
Q144	2228106107	KTA1023, PNP	1
Q145	2228406120	KTC1027, NPN	1
Q146	2208206113	MPSA56, PNP	1
Q147	2208606114	MPSA06, NPN	1
Q148	2228106107	KTA1023, PNP	1
Q149/Q150	2208606112	2SD1302S, NPN	2
Q151/Q152	2238006103	KRA107M, PNP	2
Q153/Q154	2208206104	KTA1268 BL, PNP	2
Q155/Q156	2208606108	KTC3200 BL, NPN	2
Q157/Q158	2208206104	KTA1268 BL, PNP	2
Q159/Q160	2208606108	KTC3200 BL, NPN	2
Q161	2208606114	MPSA06, NPN	1
Q162	2228106107	KTA1023, PNP	1
Q163	2208606114	MPSA06, NPN	1
Q164	2228106107	KTA1023, PNP	1
Q165	2228406120	KTC1027, NPN	1
Q166	2208206113	MPSA56, PNP	1
Q167	2208606112	2SD1302S, NPN	1
Q168	2228406120	KTC1027, NPN	1
Q169	2208206113	MPSA56, PNP	1
Q170/Q171	2208606112	2SD1302S, NPN	2
Q172	2208206105	KTA1015Y/KTA1266Y, PNP	1
Q173/Q174	2208606112	2SD1302S, NPN	2
		ICs	
IC101	2168220103	NJM-4560D, OP Amp	1
IC102	2138322177	DWP-311 CXP-82316-170Q, CPU	1
IC103	2138000149	YM-3433B Digital Filter	1
IC104	2138000194	SAA-7350GP/M3 D/A Converter	1
IC105	2138022110	CXD-1167Q, DSP	1
IC106	2168220103	NJM-4560D, OP Amp	1
IC107	2138022112	CXA-1082BS, SSP	1
IC108	2138022111	CXA-1081S, R.F Amp	1
IC109	2168206103	KIA-4559S, OP Amp	1
IC110	2168602108	KA7812, Regulator	1
IC111	2168602105	KA7805, Regulator	1
IC112	2168602113	KA7912, Regulator	1
IC113	2168602112	KA7905, Regulator	1
		Fluorescent	
FIP101	2328130311	FIP 4EM6	1
		Resonators	
X101	3938101500	X-TAL, 16.9344 MHz	1
X102	3938124010	Resonator, 10 MHz, CST10.0MTW-TF01	1
		Inductors	
L102-L104	2648610082	Coil, Fixed 10uH	3
L110	2648610182	Coil, Fixed 100uH	1
	2648707810	EMI Filter	
		Connectors	
CNT101	4428513450	Wafer 5P	1
CNT102	4428514710	Wafer 8P	1
CNT103	4428525590	Wafer 9P	1
CNT104	4428513440	Wafer 4P	1
CNT105	4428513450	Wafer 5P	1
CNT106	4428513450	Wafer 5P	1
CNT107	4428525540	Wafer 4P	1
CNT108	4428525580	Wafer 8P	1
CNT109	4428525580	Wafer 8P	1
CNT110	4428525580	Wafer 8P	1
CNT111	436104342181	Lead Ass'y 4P 340mm, to Optical/DIGI B'D	1
CNT112	4428513430	Wafer 3P	1
CNT114	436206248132	Lead Ass'y 6P 240mm, Shield to Output B'D	1
CNT115	436403223231	Lead Ass'y 3P 220mm, to CNT116 of MAIN B'D	1
	054041010049	**ASS'Y P.C.B SENSOR A**	
		Connectors	
CNT104P	4358104164	Lead Ass'y 4P 160mm, to Main B'D	1
CNT120	4428515410	Wafer 4P	1

Ref. No.	Part No.	Description	Q'ty
	054041010050	**ASS'Y P.C.B RCA JACK**	
		Miscellaneous	
60	4438103010	Jack RCA 2P	1
74	6505139410	Bracket, Ground	1
		Connector	
CNT114P	4428513460	Wafer 6P	1
		Capacitor	
C301	3519472915	Ceramic Tubular 4700 pF 16V J	1
	054041010051	**ASS'Y P.C.B OPTICAL/DIGI-LINK**	
		Miscellaneous	
61	4438007510	Jack Mini 2P	1
OPT101	2428000140	E/O PLT102, Converter, Digital Output	1
		Capacitor	
C225	3519223935	Ceramic tubular 0.02 uF 50V J	1
		Resistors	
R303	3069822970	Carbon Film 8.2 Kohm 1/5W J	1
R304	3069392970	Carbon Film 3.9 Kohm 1/5W J	1
R305	3069101970	Carbon Film 100 ohm 1/5W J	1
R306	3069473970	Carbon Film 47 Kohm 1/5W J	1
R307	3069470970	Carbon Film 47 ohm 1/5W J	1
R308	3069271970	Carbon Film 270 ohm 1/5W J	1
		Transistor	
Q175	2238006103	KRA107M, PNP	2
		IC	
IC110	2408000136	LTV-817	1
		Inductor	
L101	2648610082	Coil, Fixed 10uH	1
		Connector	
CNT111P	4428513440	Wafer 4P	1
	054002008033	**ASS'Y P.C.B FRONT**	
		Miscellaneous	
66	4658003710	SW Tact, SKHV10910D01	
67	4658004410	SW Tact, EVQ-PJJ-05T	5
		Connector	
CNT109P	436208123492	Lead Ass'y 8P 120mm to Main B'D	1
	054041010052	**ASS'Y P.C.B RMC/FUNCTION**	
		Miscellaneous	
66	4658003710	SW Tact, SKHV10910D01	
RMC01	2138000208	SBX1610-02, Remote Sensor	1
		Connector	
CNT103P	4358509121	Lead Ass'y 9P 120mm to Main B'D	1
	054041010053	**ASS'Y P.C.B. POWER SWITCH**	
		Miscellaneous	
64	4628055810	SW Push Power	1
		Connector	
CNT101P	4358105263	Lead Ass'y 5P 260mm, to Main B'D	1
	054041010054	**ASS'Y P.C.B HEADPHONE**	
		Miscellaneous	
58	3208067210	VR, Level	1
59	4438005010	Jack, Phone, ABS, Gold	1

Ref. No.	Part No.	Description			Q'ty
		Capacitors			
C501-C503	3519332935	Ceramic Tubular	3300 pF	50V J	3
		Resistors			
R501/R502	3069560970	Carbon Film	56 ohm	1/5W J	2
		Connector			
CNT112P	4358103129	Lead Ass'y 3 P 120 mm, to Main B'D			1
	054002008110	**ASS'Y P.C.B POWER TRANS.**			
		Miscellaneous			
	4255001010	Clip Fuse			1
	4228001410	Pin Solder			2
F101 ⚠	5508101421	Fuse, SB 350mA 125V (UL/CSA)			1
TRANS ⚠	2828001357	Power transformer 120V 60Hz			1
		Connector			
LV101	4428525780	LV BASE 2P			1
	054041010055	**ASS'Y P.C.B DISC SENSOR**			
		Miscellaneous			
57	2408001111	SG-2, Sensor Photo			1
	4002517730	P.C.B Disc Sensor			1
		Resistors			
R301	3069151970	Carbon Film	150 ohm	1/5W J	1
R302	3069103970	Carbon Film	10 kohm	1/5W J	1
		Connector			
CNT201	4358103247	Lead Ass'y 3P 200 mm, to Skip Motor B'D			1

The following parts are only for 230V version.

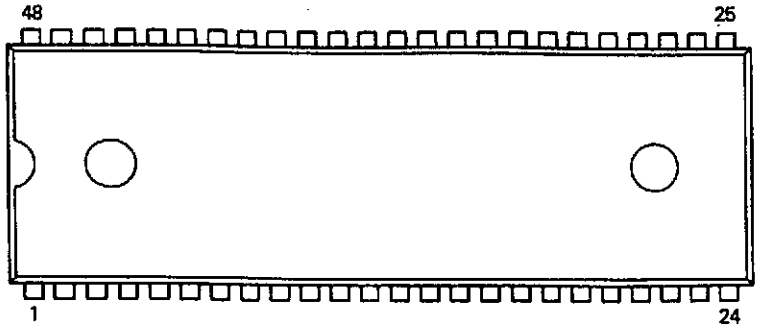
	054040480056	**ASS'Y P.C.B POWER TRANS.**			
		Miscellaneous			
	4255001010	Clip Fuse			1
	4228001410	Pin Solder			2
F101 ⚠	5508101421	Fuse TL 16mA 250V(SEMKO)			1
TRANS ⚠	2828100247	Power transformer 230V 50Hz			1
		Connector			
LV101	4428525780	LV BASE 2P			1
P1	**054002008030**	**ASS'Y P.C.B MAIN**			1
C303	3579100130	Ceramic Disc	10 pF	50V J	1

PRODUCT SAFETY NOTICE

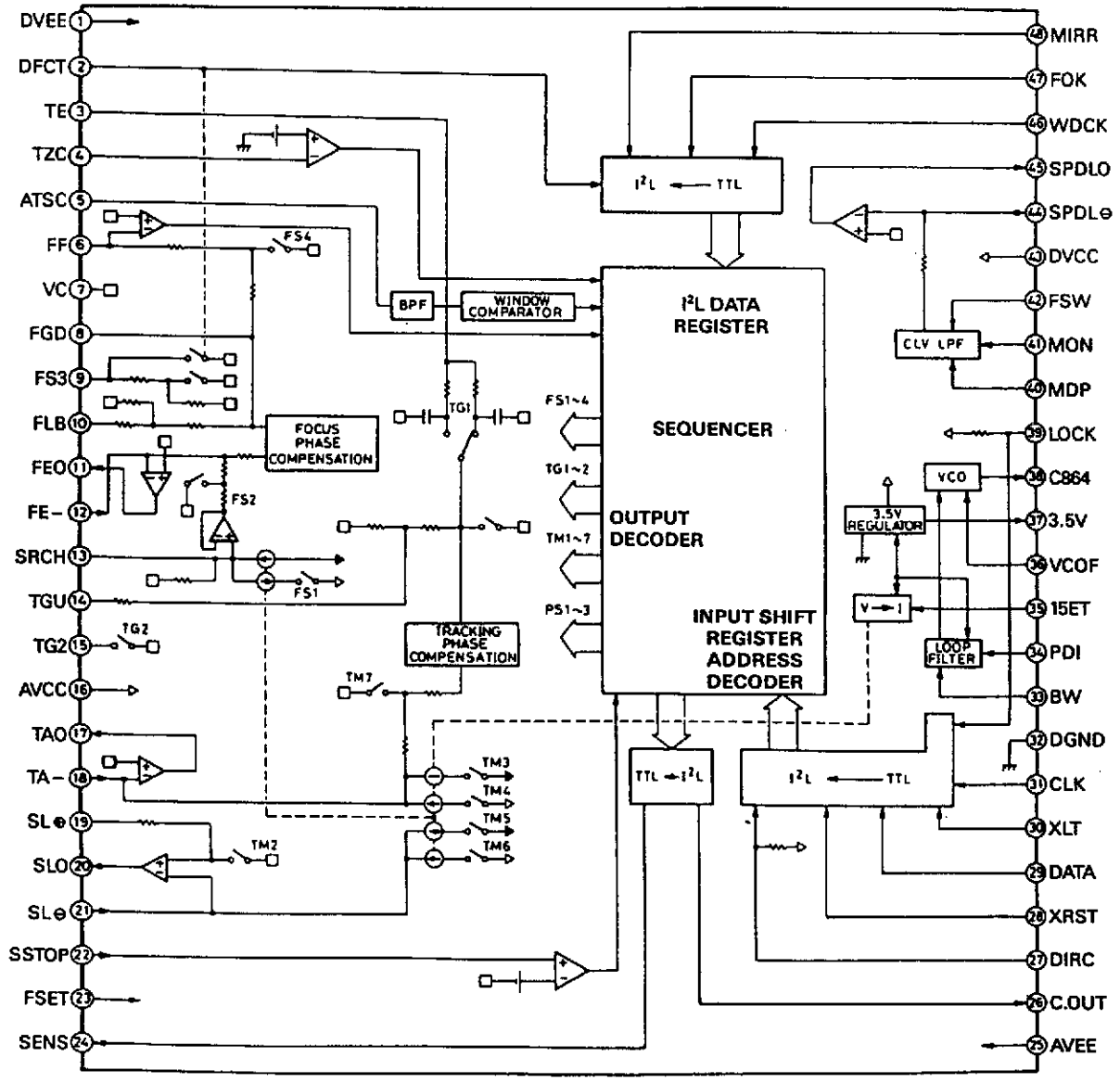
Each precaution in this manual should be follower during servicing. Components identified with the IEC symbol ⚠ in the parts list and the safety can be of special significance. When replacing a component identified with ⚠ , use only the replacement parts designated, or parts with the same ratings of resistance, wattage or voltage that are designated in the parts list in this manual. Leakage-current or resistance measurements must be made to determine that exposed parts are acceptably insulated from the supply circuit before returing the product to the customer.

IC FUNCTIONAL BLOCK DIAGRAM

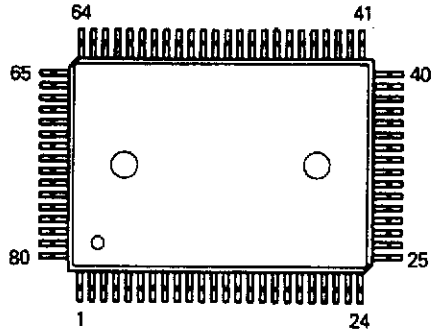
CXA1082BS : IC107

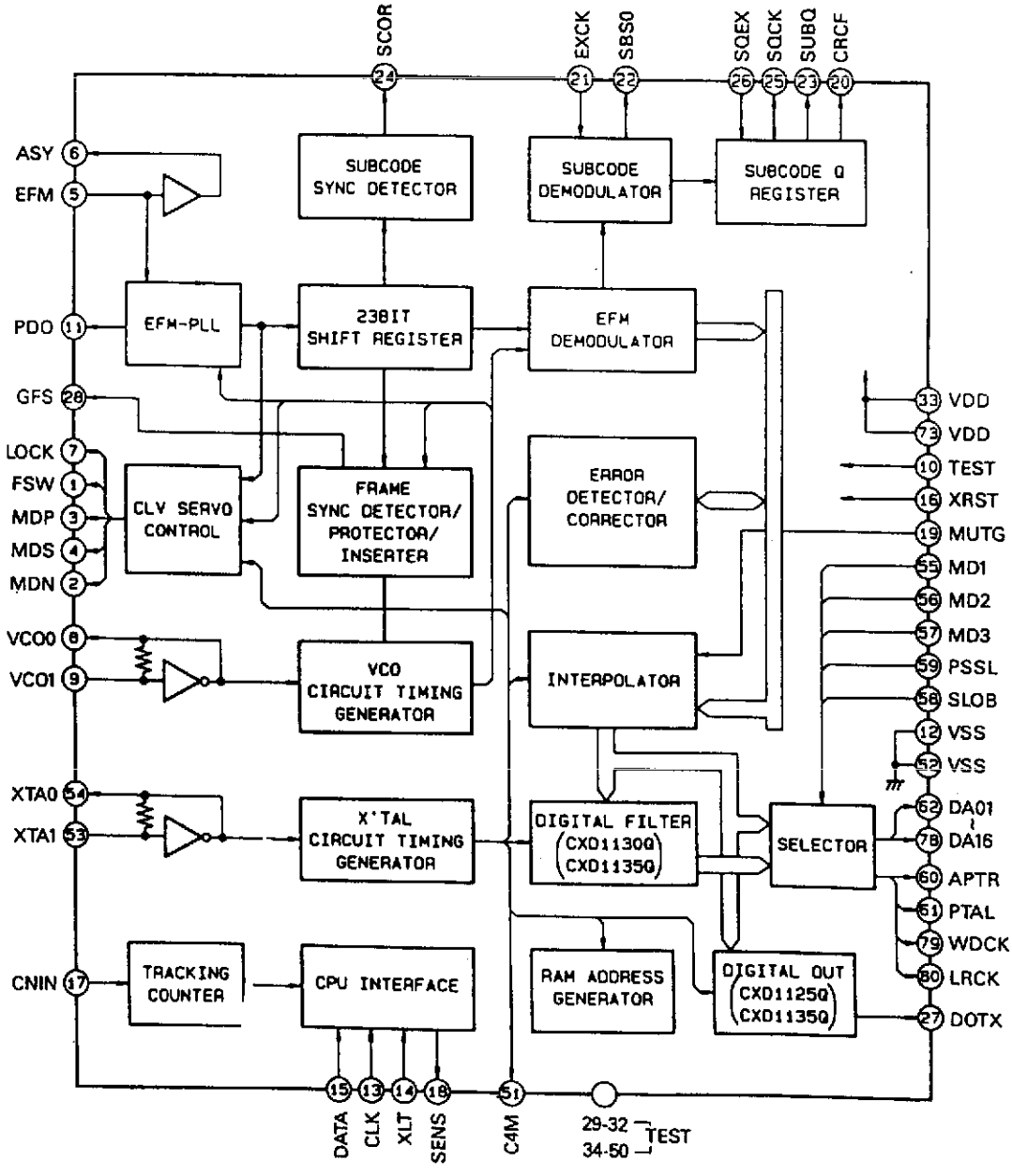


Servo Signal Processor

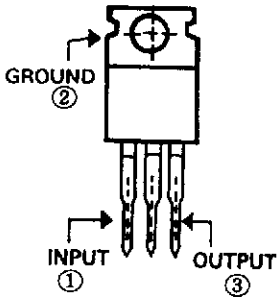


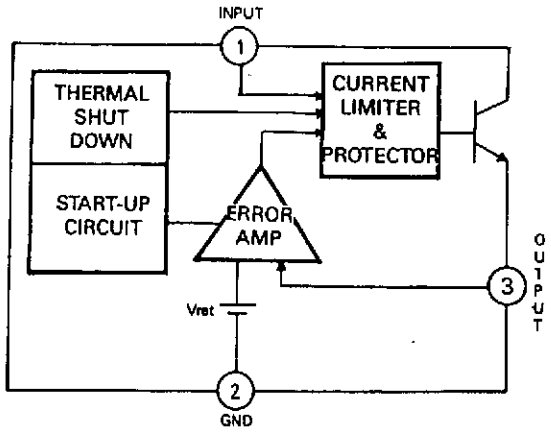
CXD1167Q : IC105 (Digital Signal Processor)



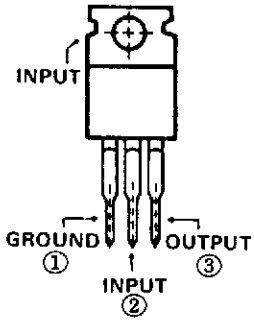


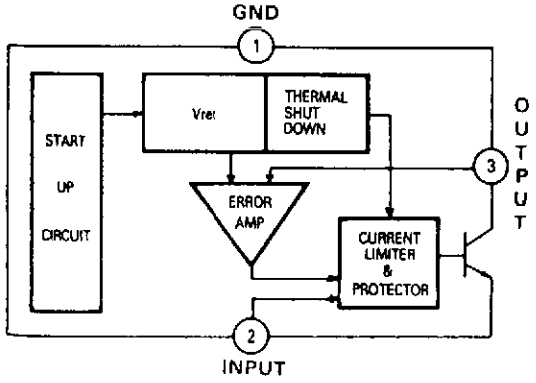
GD78XX : IC110, IC111



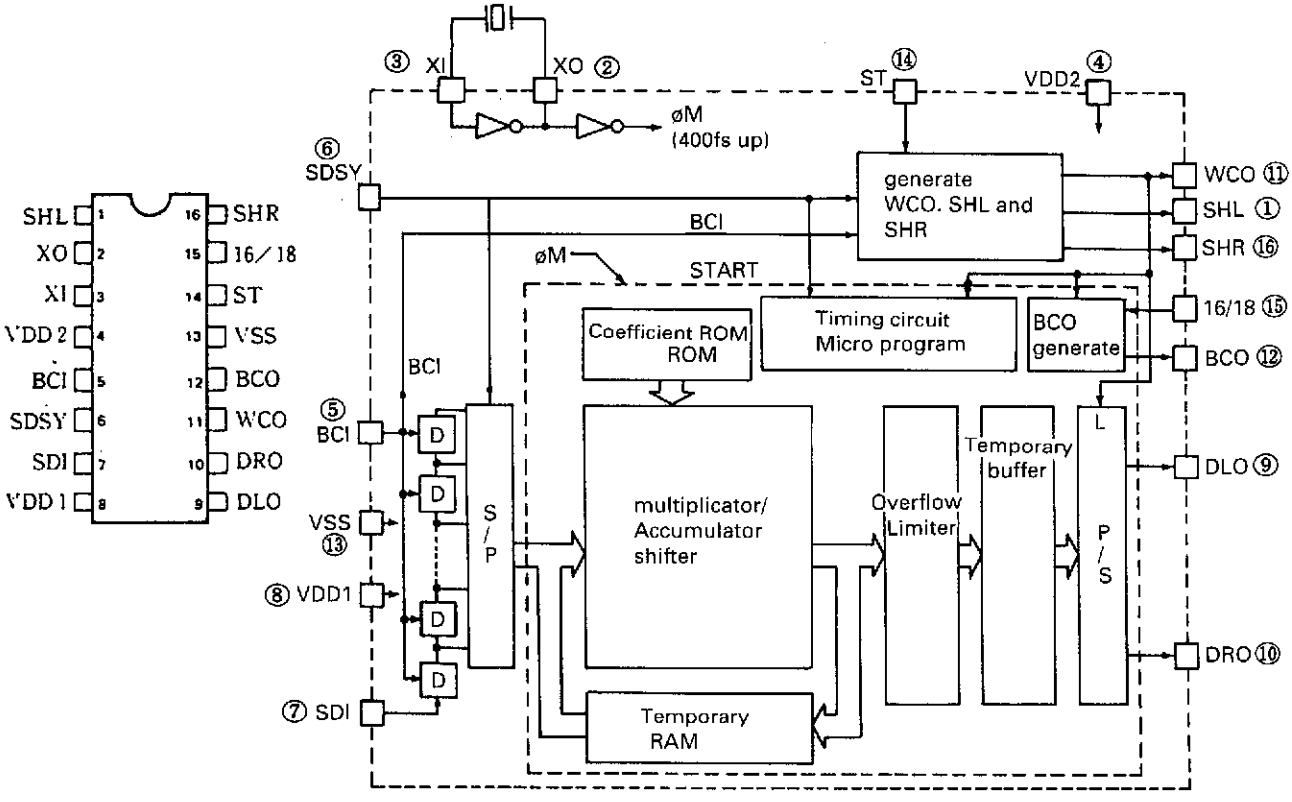


GD79XX : IC112, IC113

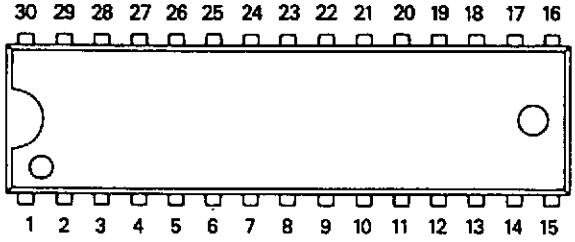




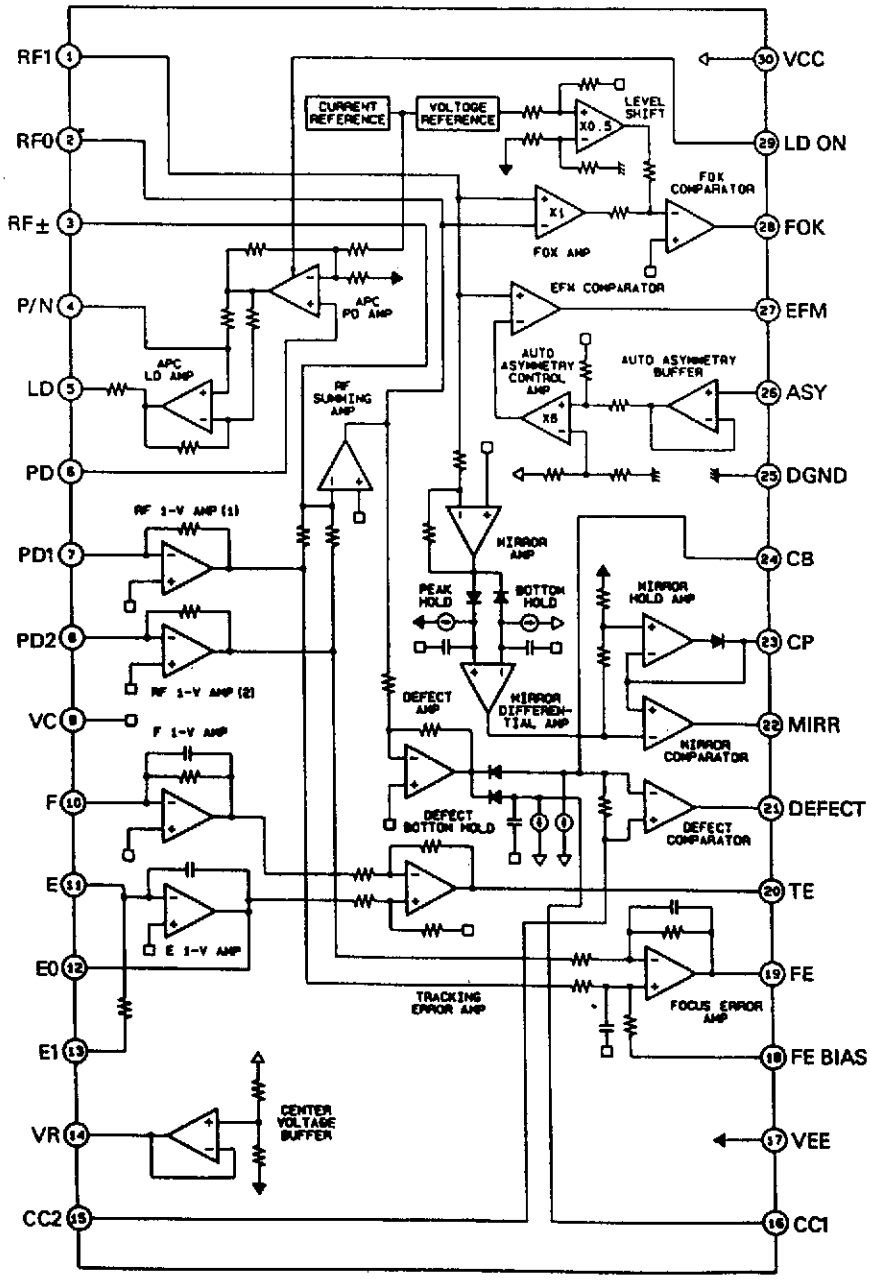
YM3433B-D : IC103



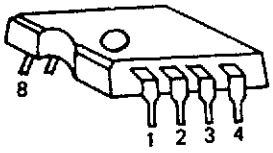
CXA1081S : IC108

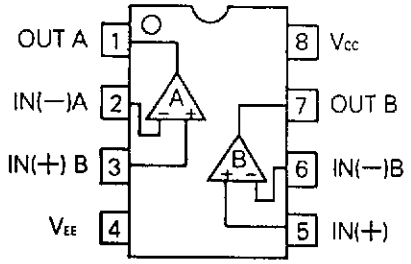


RF Amp.

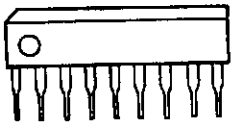


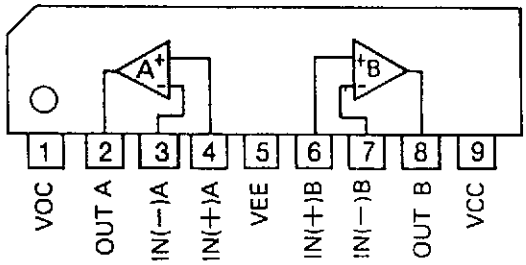
NJM4560D : IC101, IC106



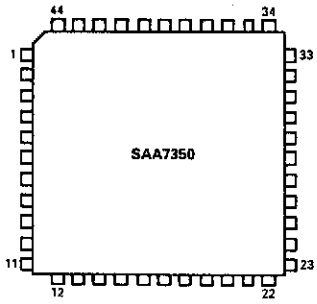


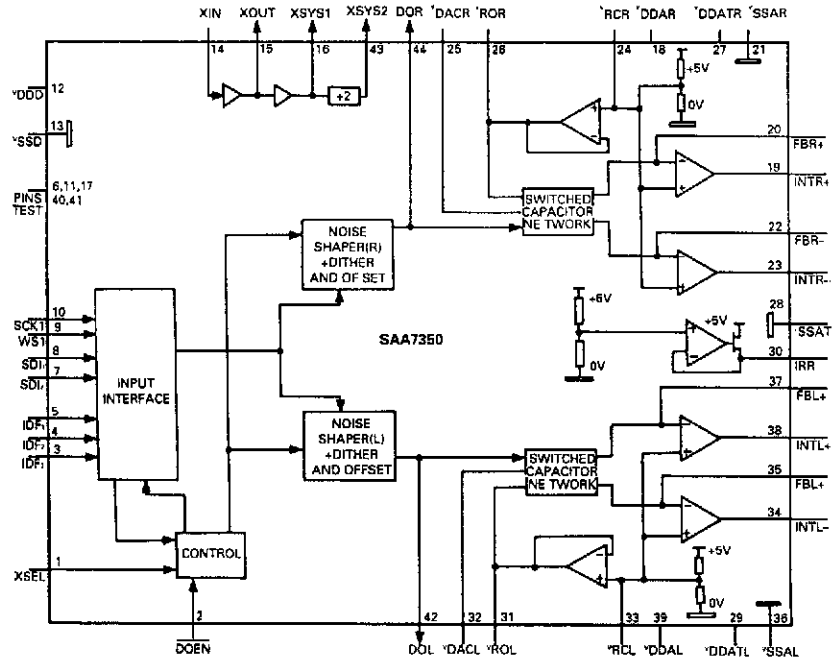
NJM4560S
KIA4559S : IC109



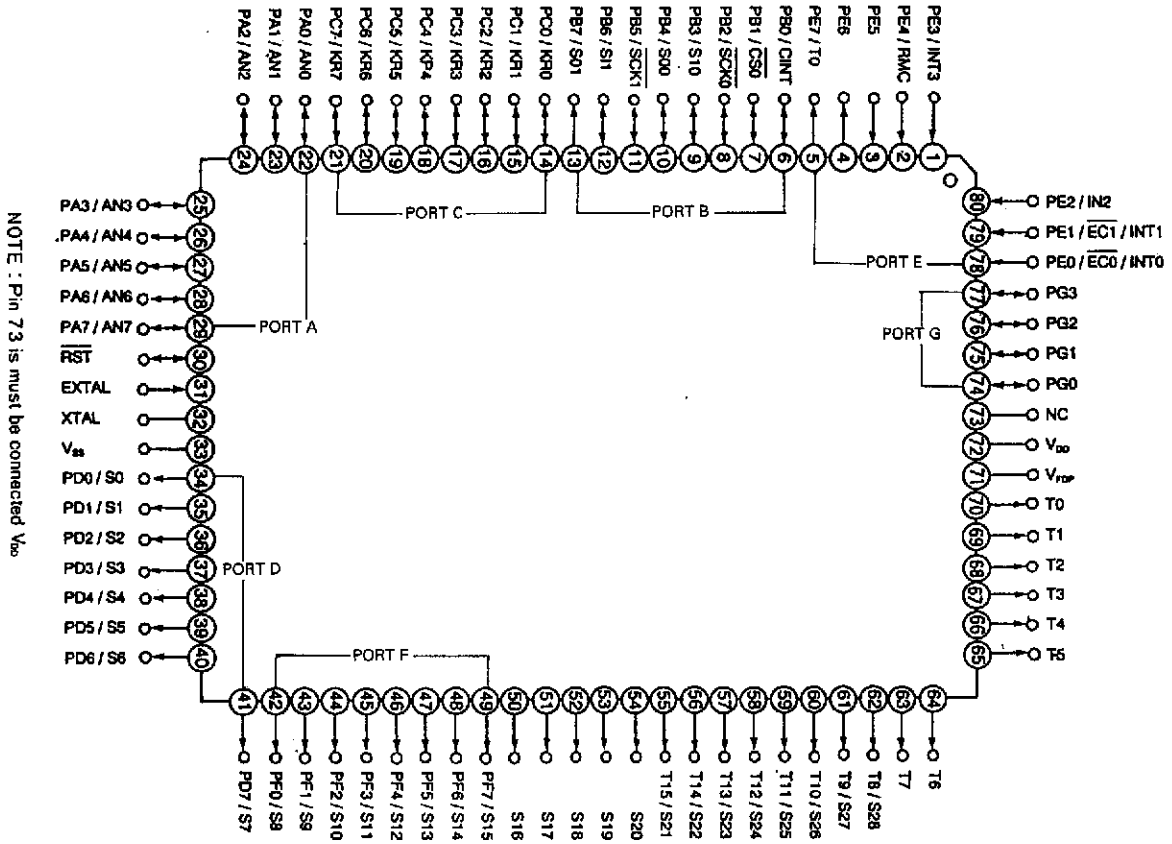


SAA-7350GP/M3 : IC104

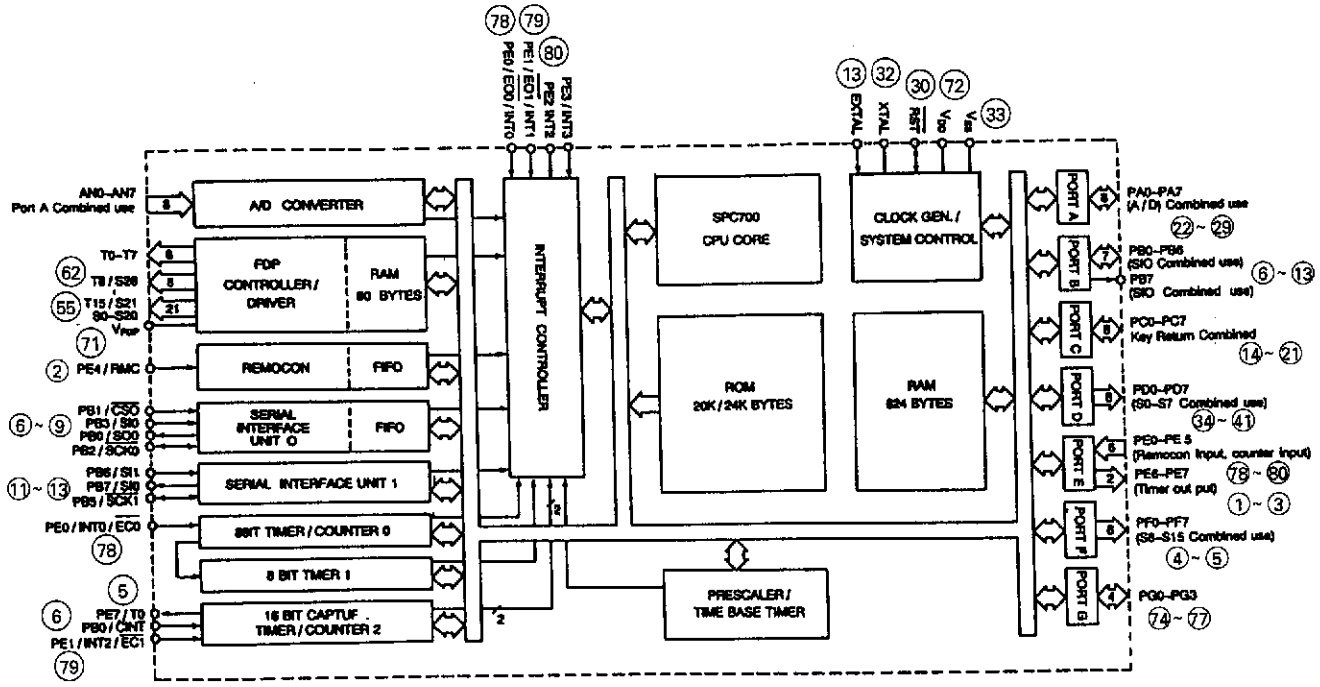




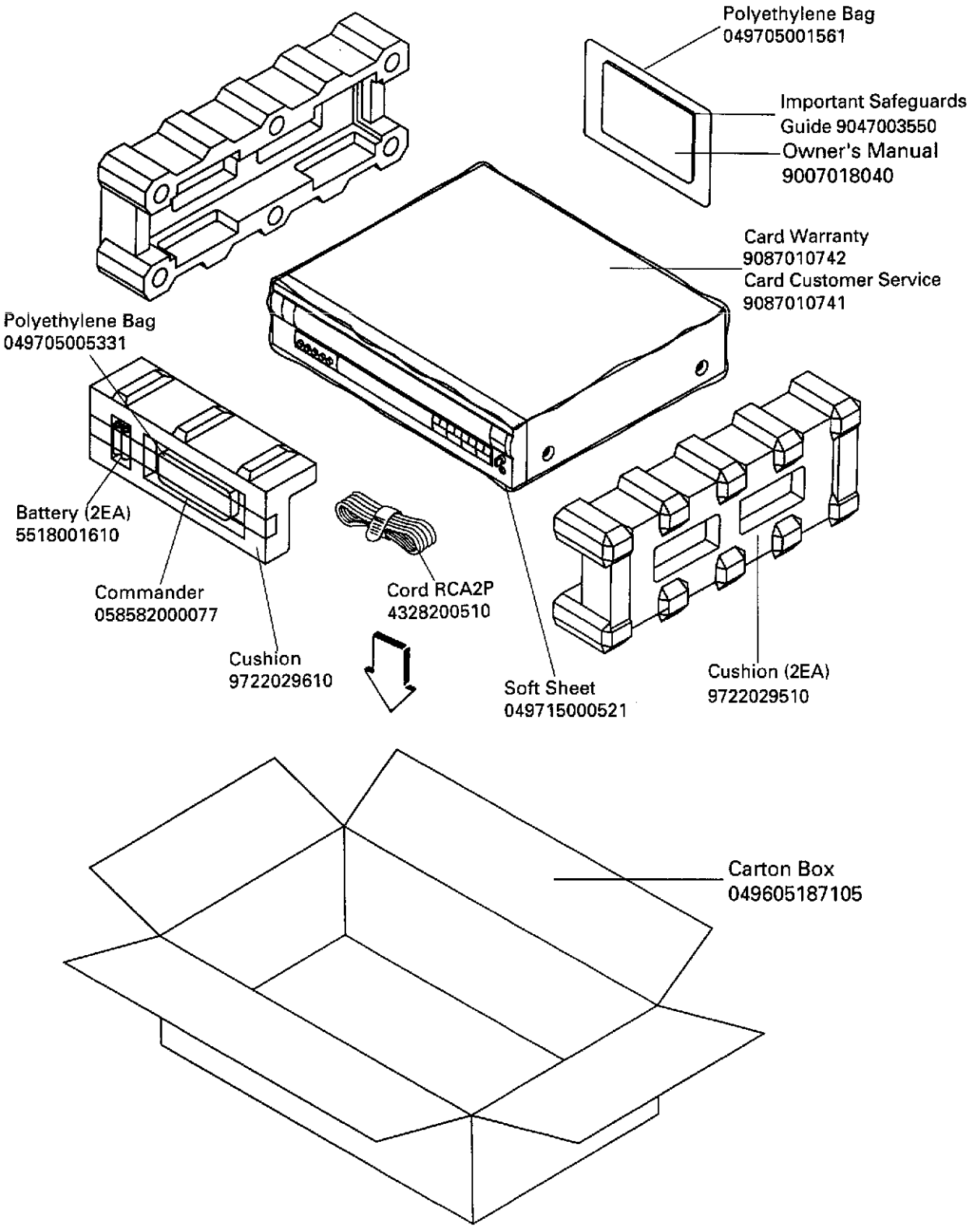
DWP 311, CXP 82316 CPU : IC102 (BLOCK DIAGRAM)



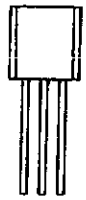
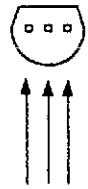
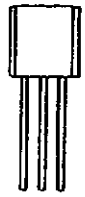
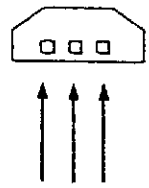
NOTE : Pin 73 is must be connected V_{DD}

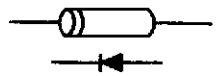
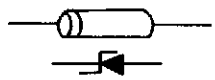


PACKAGE


Polyethylene Bag
049705001561
Important Safeguards
Guide 9047003550
Owner's Manual
9007018040
Card Warranty
9087010742
Card Customer Service
9087010741
Polyethylene Bag
049705005331
Battery (2EA)
5518001610
Commander
058582000077
Cord RCA2P
4328200510
Cushion
9722029610
Soft Sheet
049715000521
Cushion (2EA)
9722029510
Carton Box
049605187105

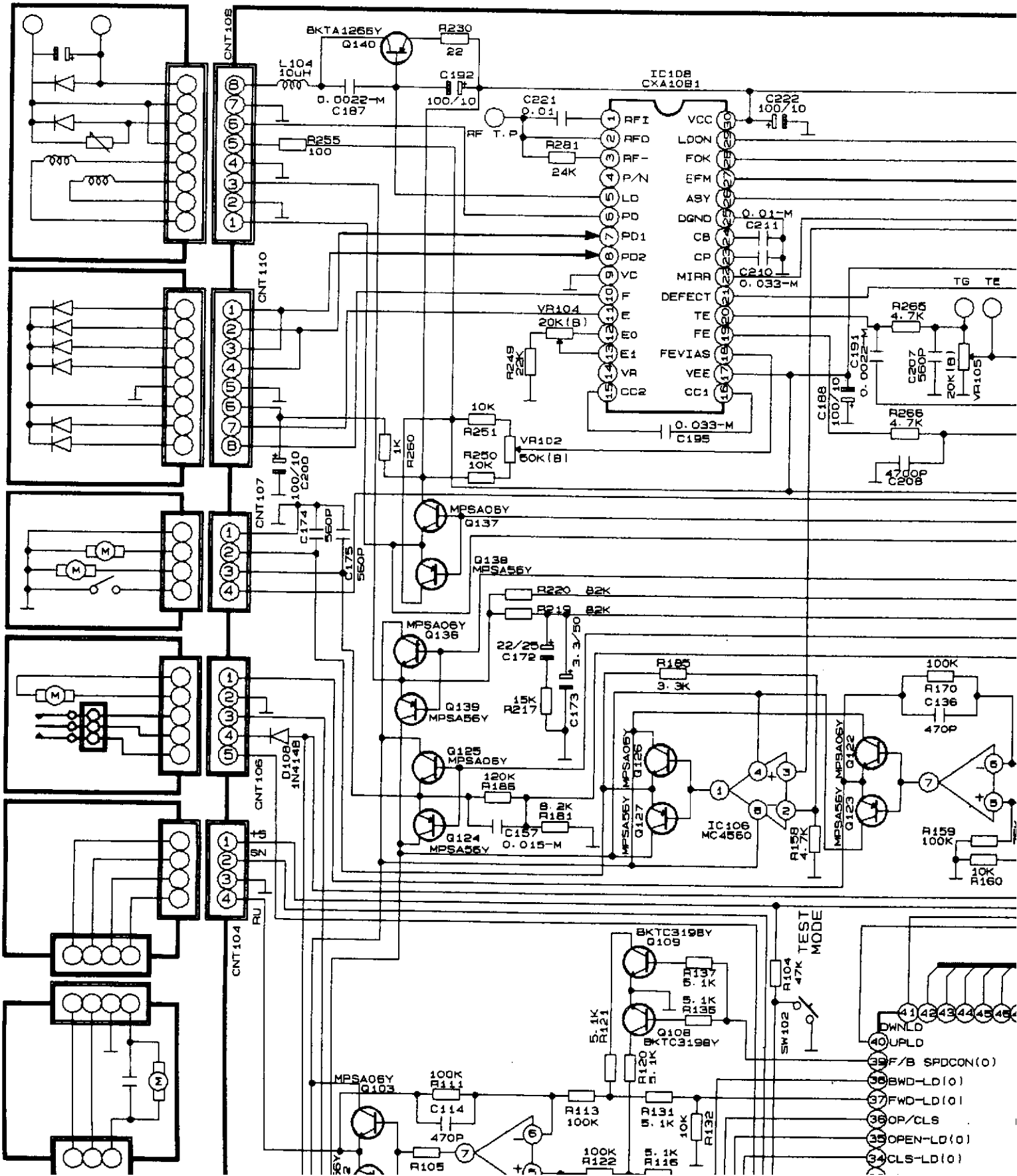
TRANSISTOR LEAD IDENTIFICATION

TRANSISTOR	FRONT VIEW	BOTTOM VIEW
KTA 1268BL KTC 2240B/KTC3200BL KTC 1815Y/KTC 3198Y KTA 1015Y/KTA 1266Y KTA 1302B 2SD 1302S KTC 2235Y/KTC1027 KTC 2236AY KTA965Y/KTA1023	 ECB	 ECB
MPSA 06 MPSA56	 EBC	 EBC
DTA 114YS/KRA107M DTC 114YS DTC 114TS DTC 144E	 ECB	 ECB

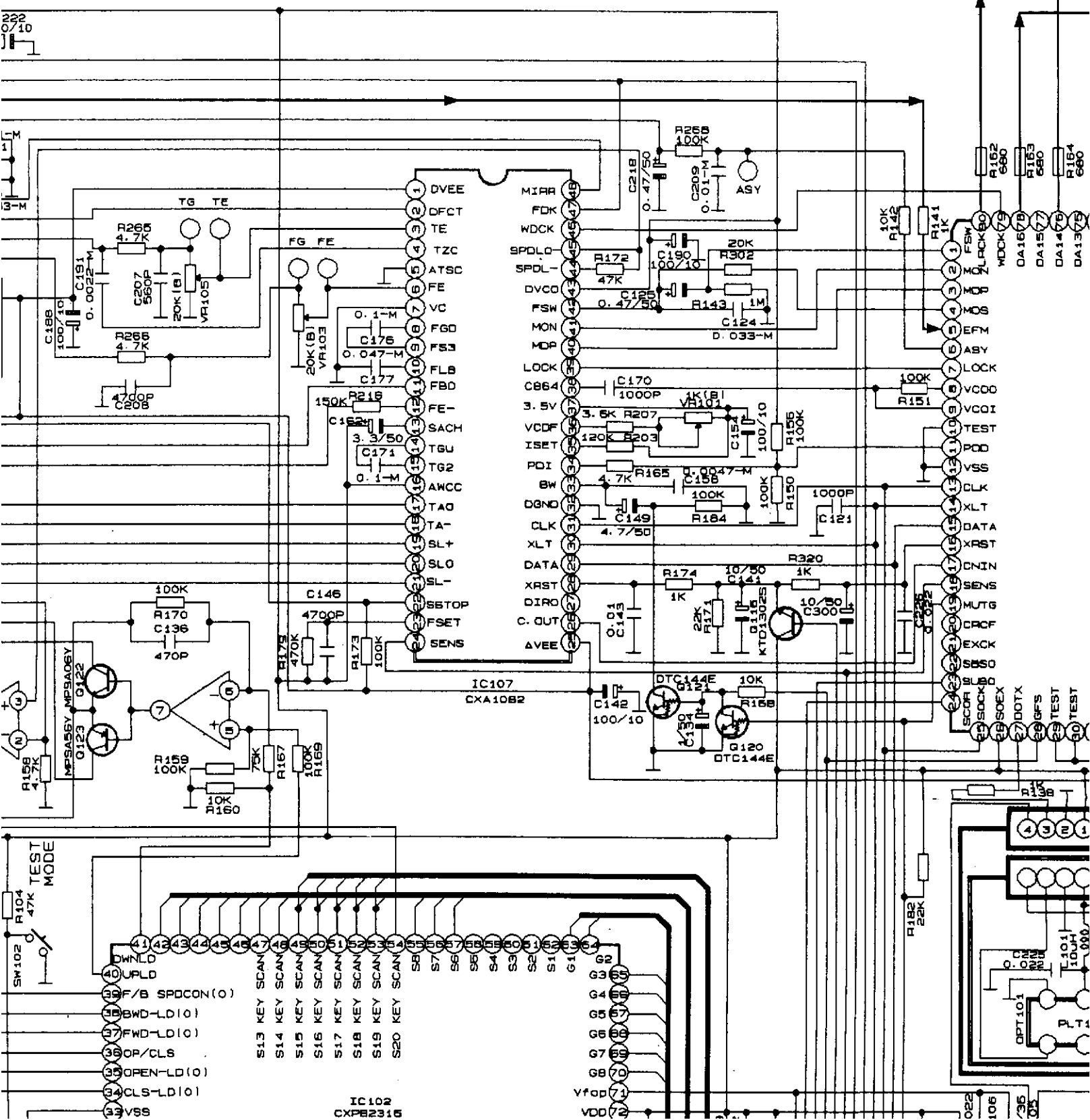
DIODE	PACKAGE VIEW
1N 4148 1N 4002	
UN XX. XBSX	

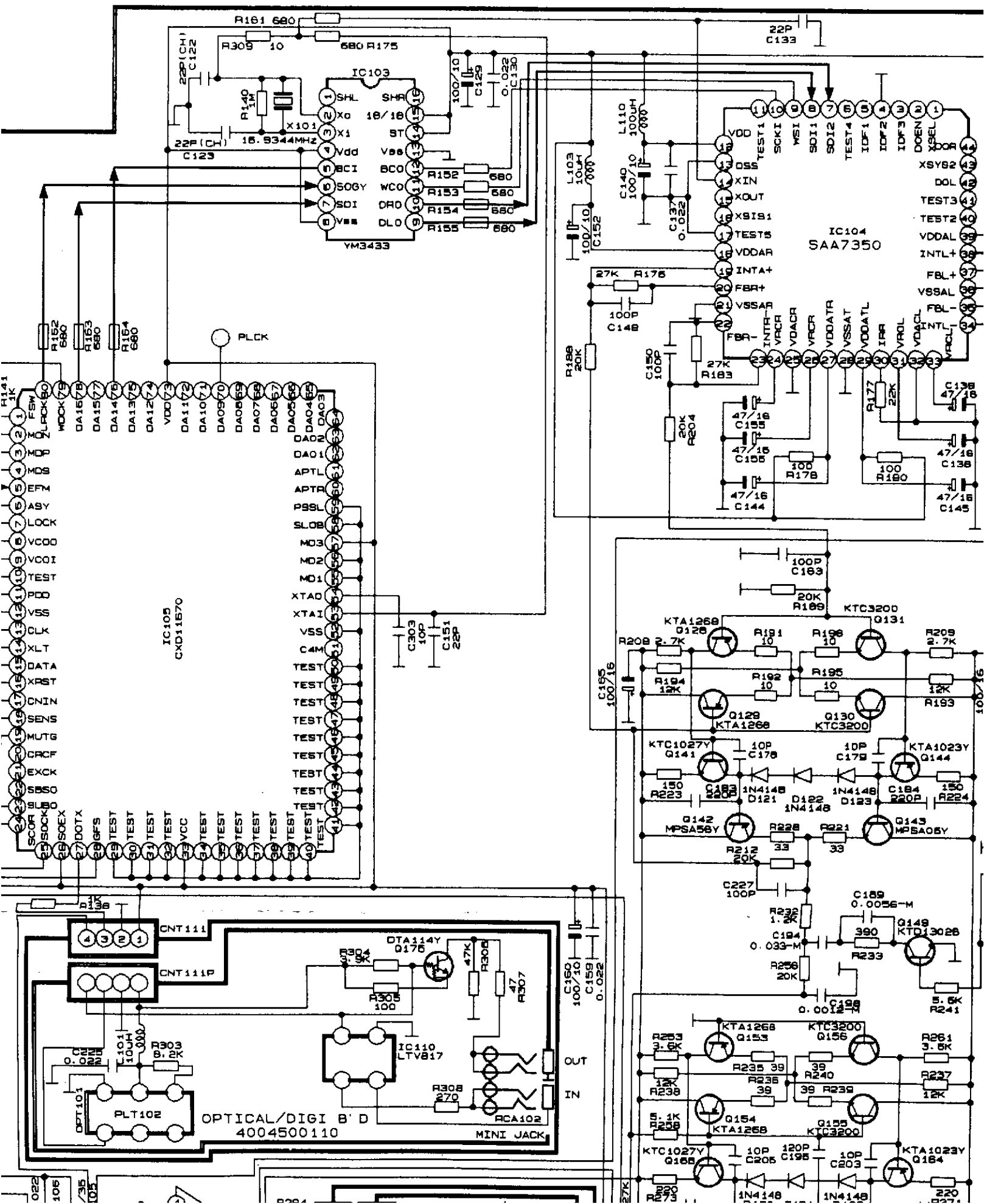
TERMINAL NAME
B : BASE C : COLLECTOR E : EMITTER

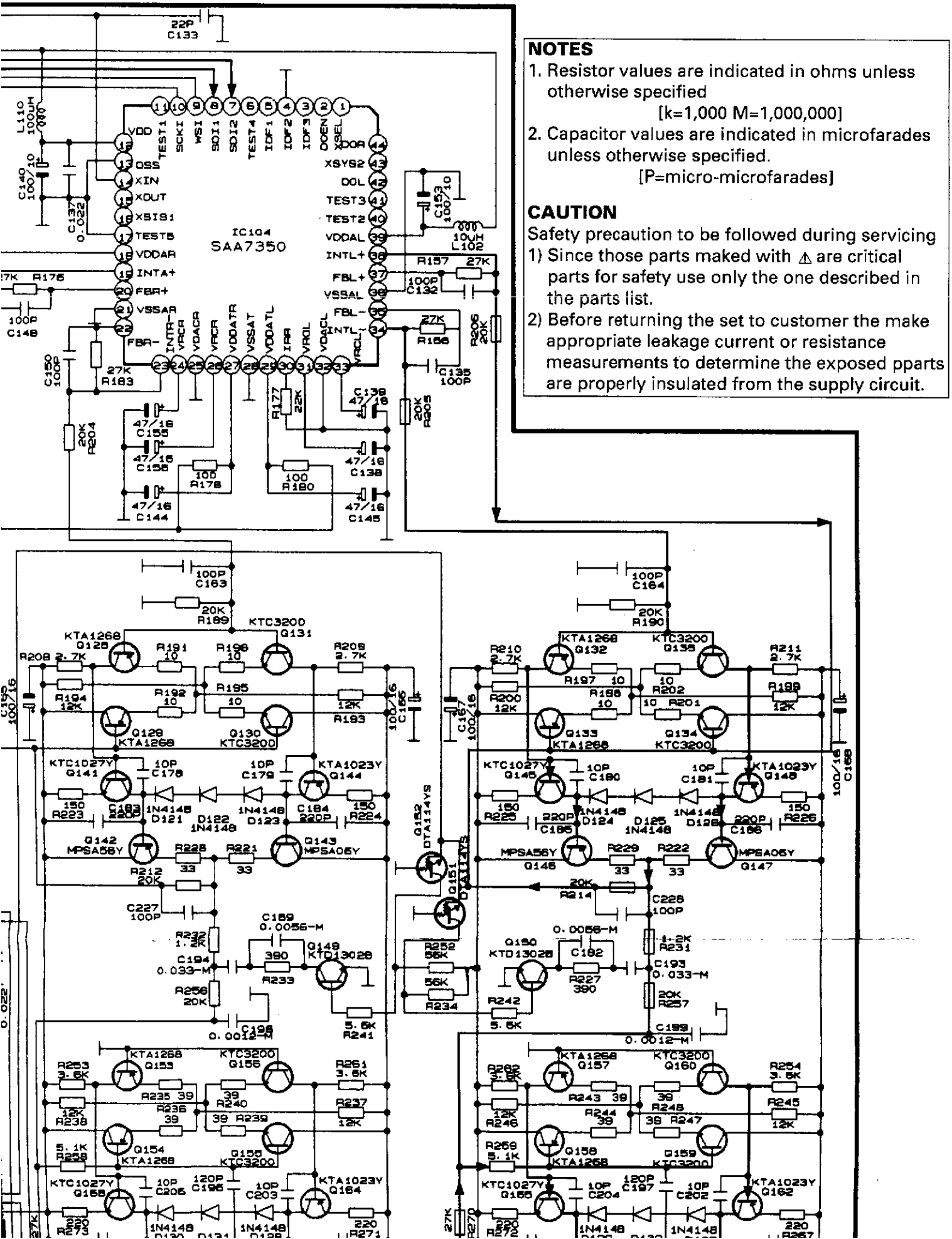
SCHEMATIC DIAGRAM



MAIN B'D 4004500100




IC103
YM3433
IC104
SAA7350
IC105
CXD1167Q
Q126 KTA1268
Q128 KTA1268
Q130 KTC3200
Q131 KTC3200
Q141 KTC1027Y
Q144 KTA1023Y
Q142 MPSA56Y
Q143 MPSA06Y
Q149 KTD13026
Q153 KTA1268
Q154 KTA1268
Q155 KTC3200
Q156 KTC3200
Q164 KTA1023Y
Q168 KTC1027Y
Q176 DTA114Y
D121 1N4148
D122 1N4148
D123 1N4148
IC110 LTV817
CNT111
CNT111P
PLT102
OPT101
RCA102
MINI JACK
OUT
IN
OPTICAL/DIGI B'D
4004500110
PLCK



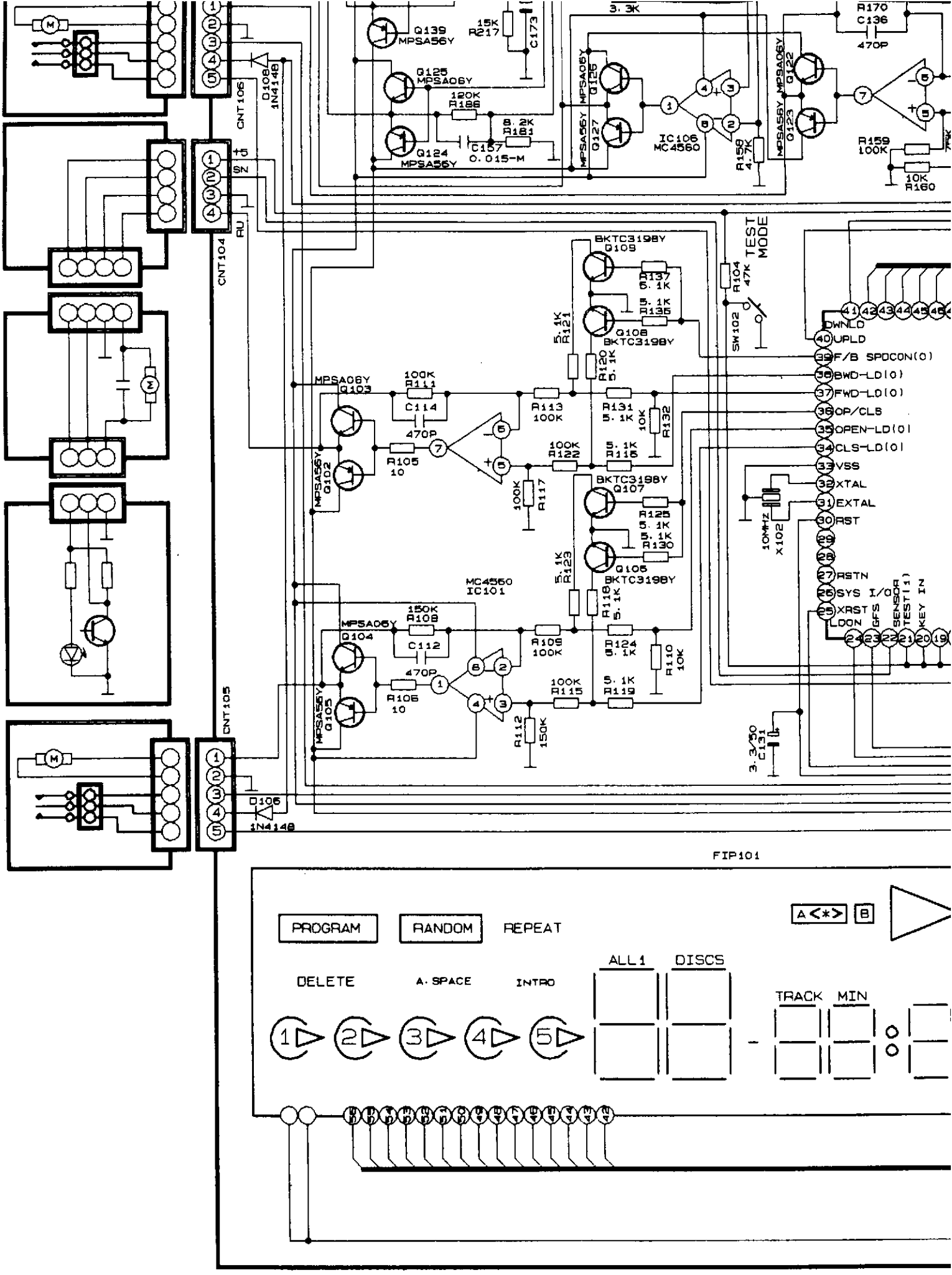
NOTES

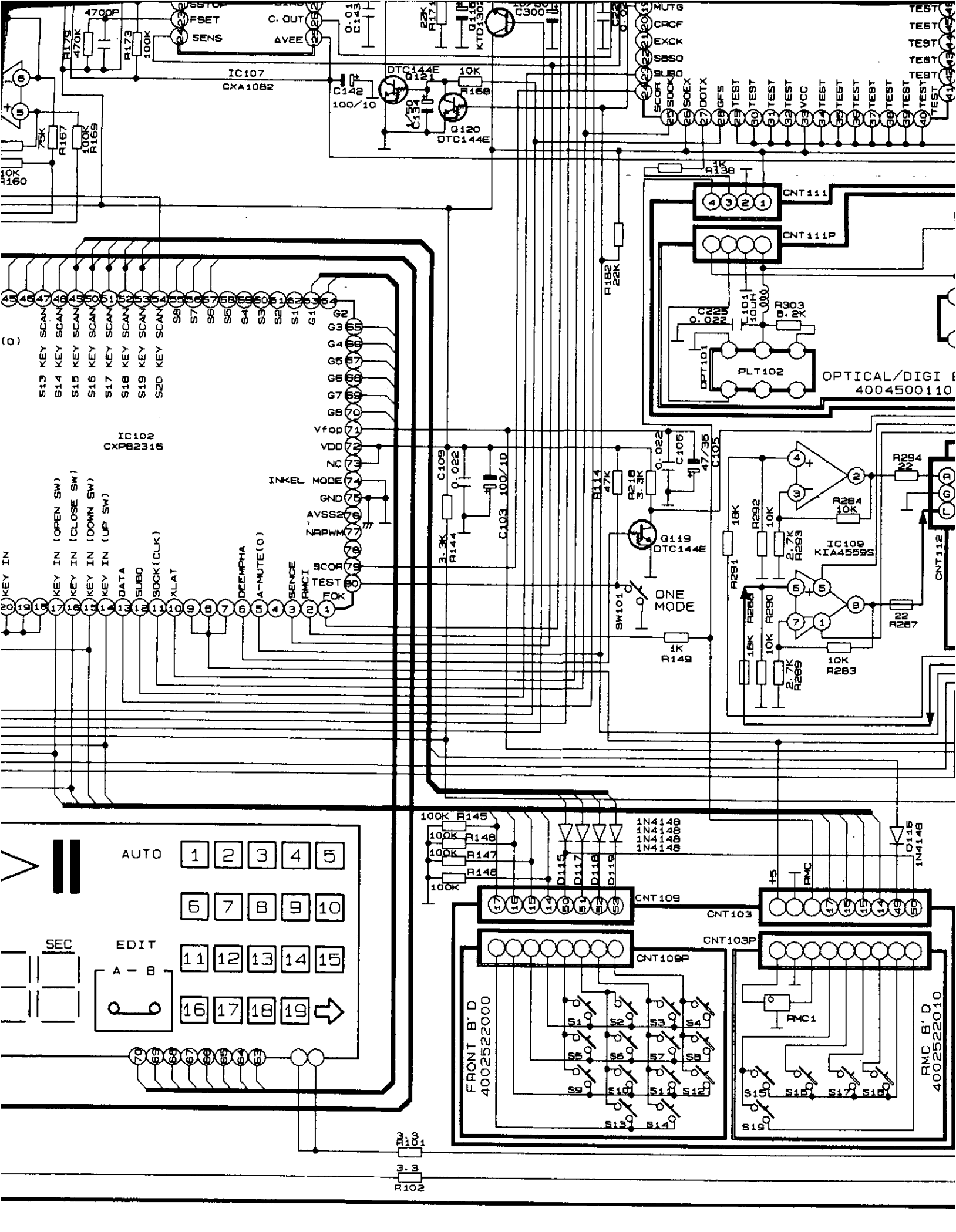
1. Resistor values are indicated in ohms unless otherwise specified
   [k=1,000 M=1,000,000]
2. Capacitor values are indicated in microfarades unless otherwise specified.
   [P=micro-microfarades]

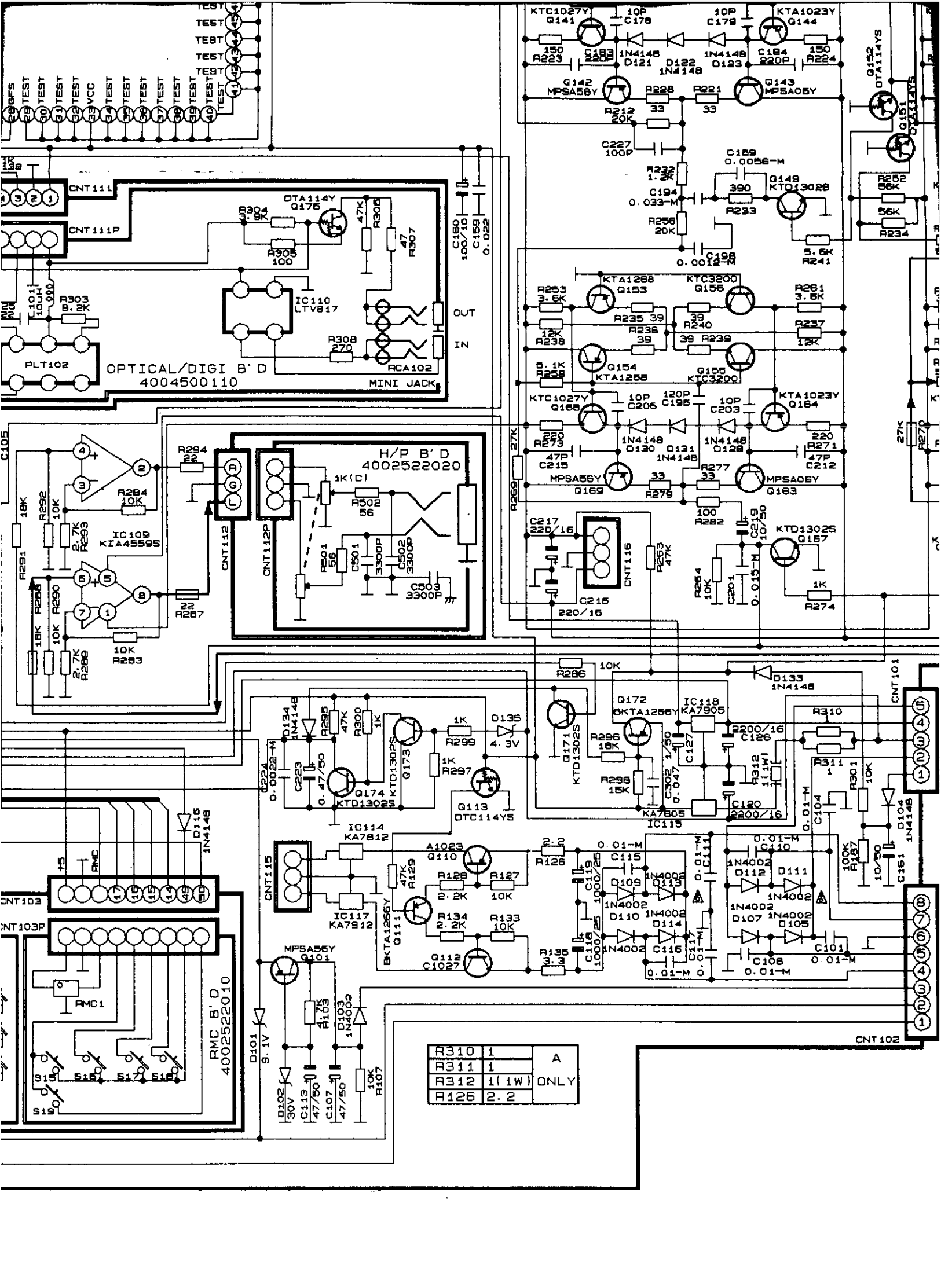
CAUTION

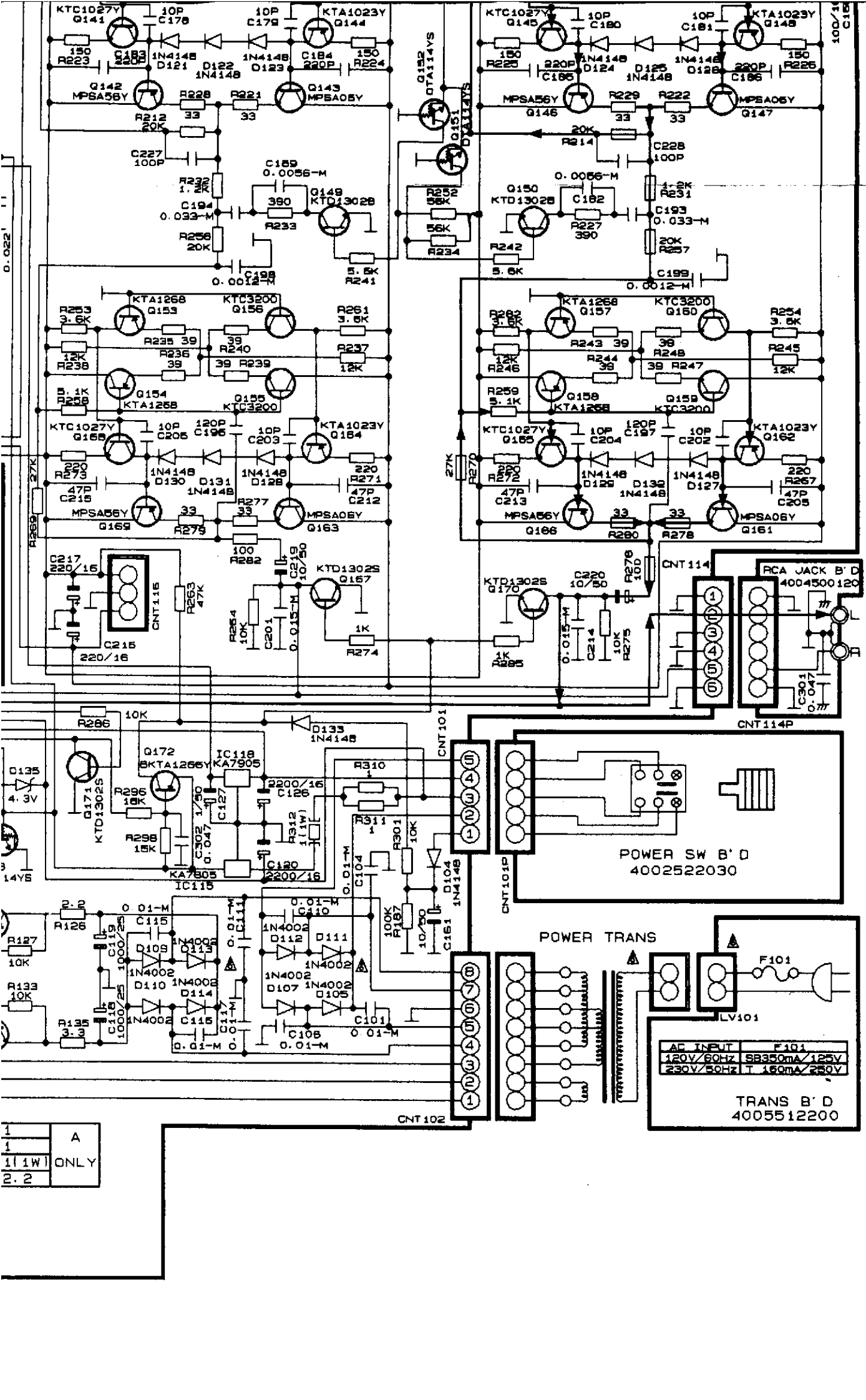
Safety precaution to be followed during servicing

1) Since those parts maked with ⚠ are critical parts for safety use only the one described in the parts list.
2) Before returning the set to customer the make appropriate leakage current or resistance measurements to determine the exposed pparts are properly insulated from the supply circuit.

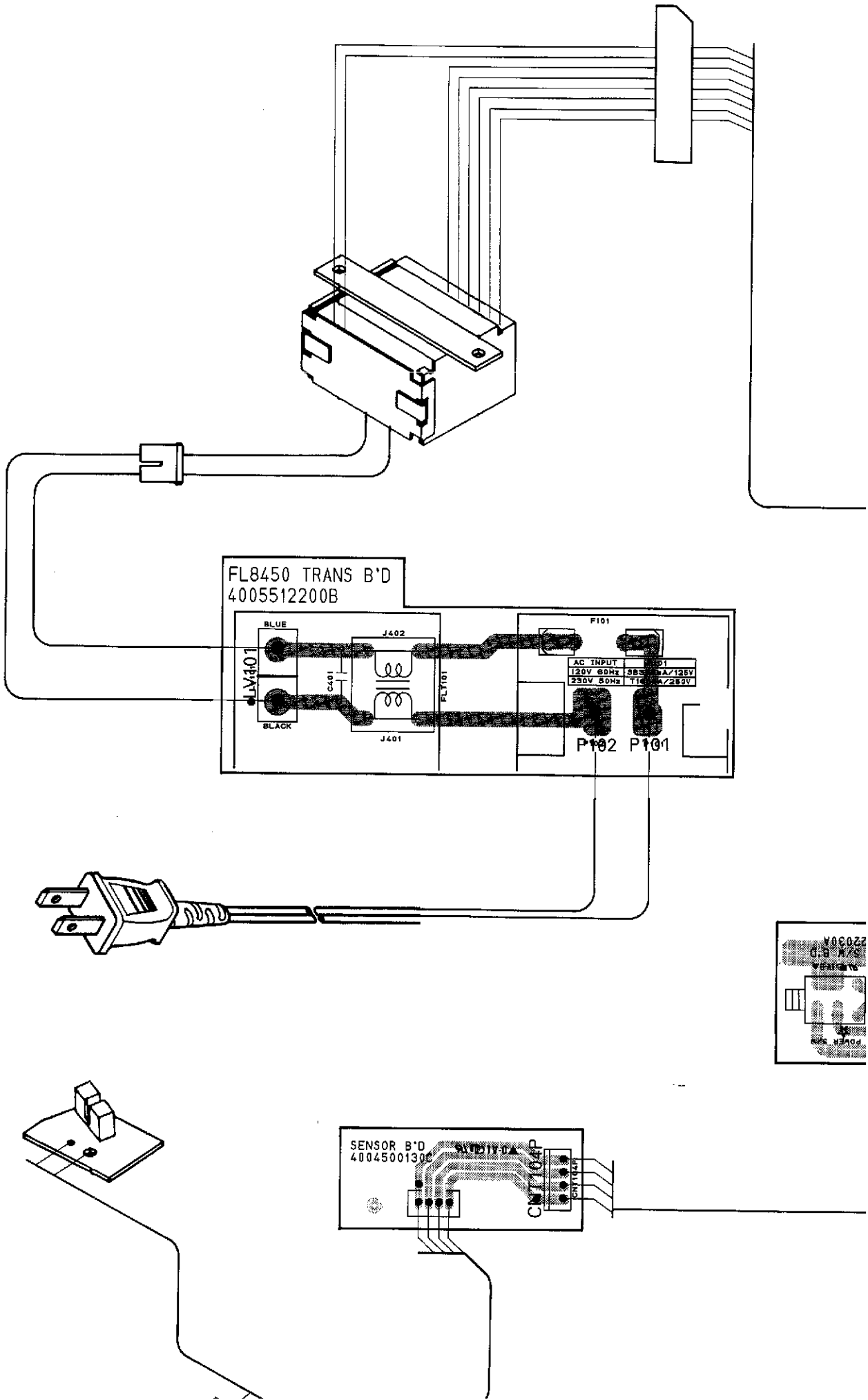

CNT106
CNT104
CNT105
D108 1N4148
D106 1N4148
+5
SN
RU
Q139 MPSA56Y
Q125 MPSA06Y
Q124 MPSA56Y
15K R217
C173
120K R186
8.2K R181
C157 0.015-M
3.3K
IC106 MC4560
R158 4.7K
R170
C136
470P
R159 100K
10K R160
TEST MODE
R104 47K
SW102
BKTC3198Y Q109
R137 5.1K
R135 5.1K
Q108 BKTC3198Y
R121 5.1K
R120 5.1K
MPSA06Y Q103
100K R111
C114
470P
R105 10
R113 100K
R131 5.1K
R132 10K
100K R122
5.1K R116
100K R117
MPSA56Y Q102
BKTC3198Y Q107
R125 5.1K
R130 5.1K
Q106 BKTC3198Y
R123 5.1K
R118 5.1K
MC4560 IC101
150K R108
MPSA06Y Q104
C112
470P
R106 10
R109 100K
R124 5.1K
R110 10K
100K R115
5.1K R119
MPSA56Y Q105
R112 150K
3.3/50 C131
10MHz X102
DWNLD
UPLD
F/B SPDCON(0)
BWD-LD(0)
FWD-LD(0)
OP/CLS
OPEN-LD(0)
CLS-LD(0)
VSS
XTAL
EXTAL
RST
RSTN
SYS I/O
XRST
LDON
GFS
SENSOR TEST(1)
KEY IN
FIP101
PROGRAM
RANDOM
REPEAT
A<*>B
DELETE
A-SPACE
INTRO
ALL1
DISCS
TRACK
MIN

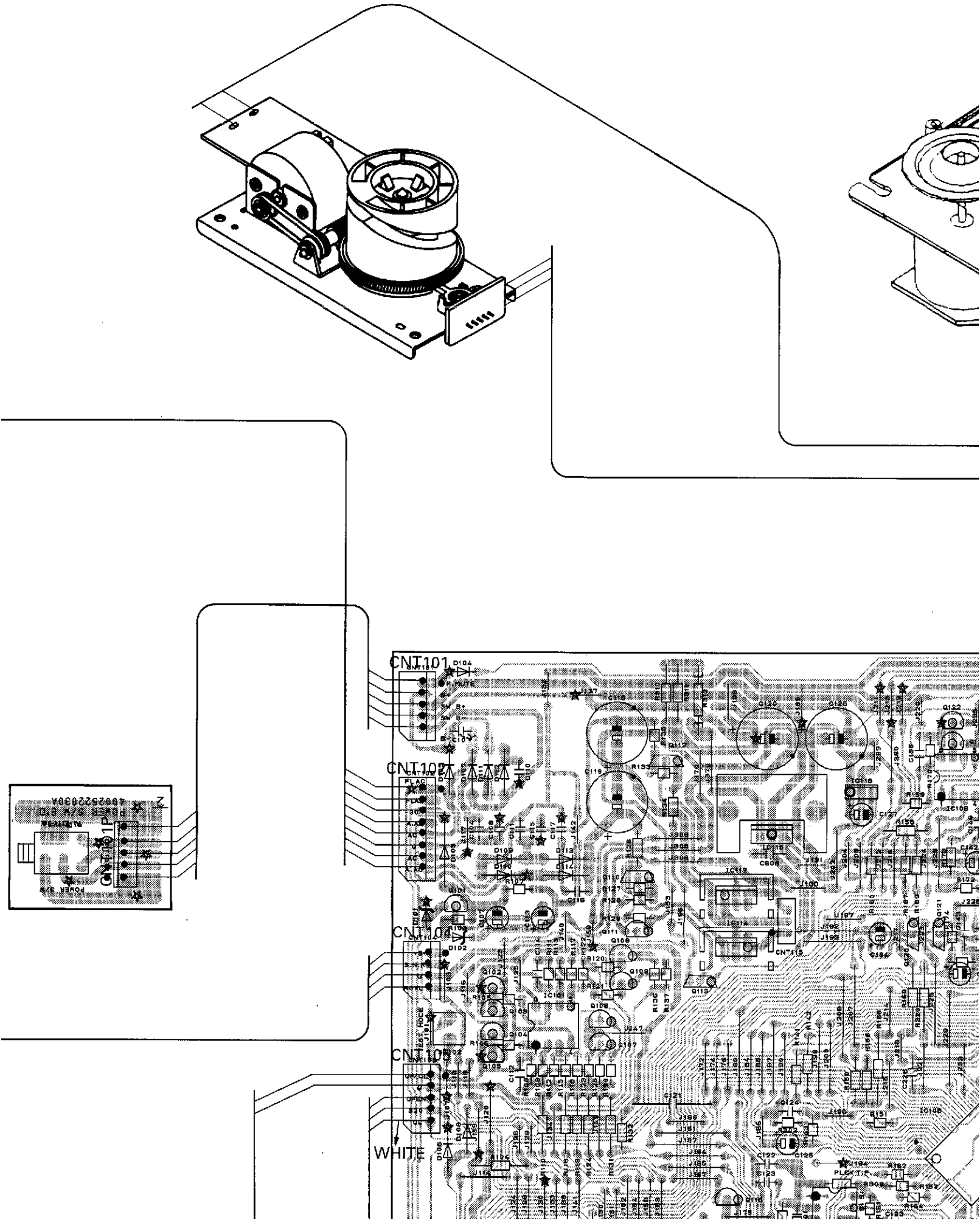

IC107
CXA1082
DTC144E
Q121
Q120
DTC144E
C142
100/10
R168
10K
R179
470K
R173
100K
R157
75K
R169
100K
R160
10K
4700P
FSET
SENS
C. OUT
AVEE
MUTG
CRCF
EXCK
SBSO
SUBO
SCOR
SOCK
SOEX
DOTX
GFS
TEST
VCC
IC102
CXP82316
INKEL MODE
GND
AVSS2
NRPWM
SCOR
TEST
FOK
DEEMPHA
A-MUTE(O)
SENCE
RMCI
DATA
SUBO
SOCK(CLK)
XLAT
KEY IN
KEY IN (OPEN SW)
KEY IN (CLOSE SW)
KEY IN (DOWN SW)
KEY IN (UP SW)
S13 KEY SCAN
S14 KEY SCAN
S15 KEY SCAN
S16 KEY SCAN
S17 KEY SCAN
S18 KEY SCAN
S19 KEY SCAN
S20 KEY SCAN
G2
G3
G4
G5
G6
G7
G8
Vfop
VDD
NC
CNT111
CNT111P
R182
22K
C225
0.022
L101
10UH
R303
8.2K
DPT101
PLT102
OPTICAL/DIGI
4004500110
R138
1K
C109
0.022
C103
100/10
R144
3.3K
R114
47K
R218
3.3K
C106
0.022
C105
47/35
G119
DTC144E
SW101
ONE
MODE
R149
1K
R294
22K
R284
10K
R292
10K
R291
18K
R293
2.7K
IC109
KIA4559S
R288
18K
R290
10K
R289
2.7K
R287
22
R283
10K
CNT112
R145
100K
R146
100K
R147
100K
R148
100K
D115
D117
D118
D119
1N4148
CNT109
CNT103
CNT109P
CNT103P
FRONT B'D
4002522000
RMC B'D
4002522010
RMC1
AUTO
SEC
EDIT
A - B
R101
3.3
R102
3.3

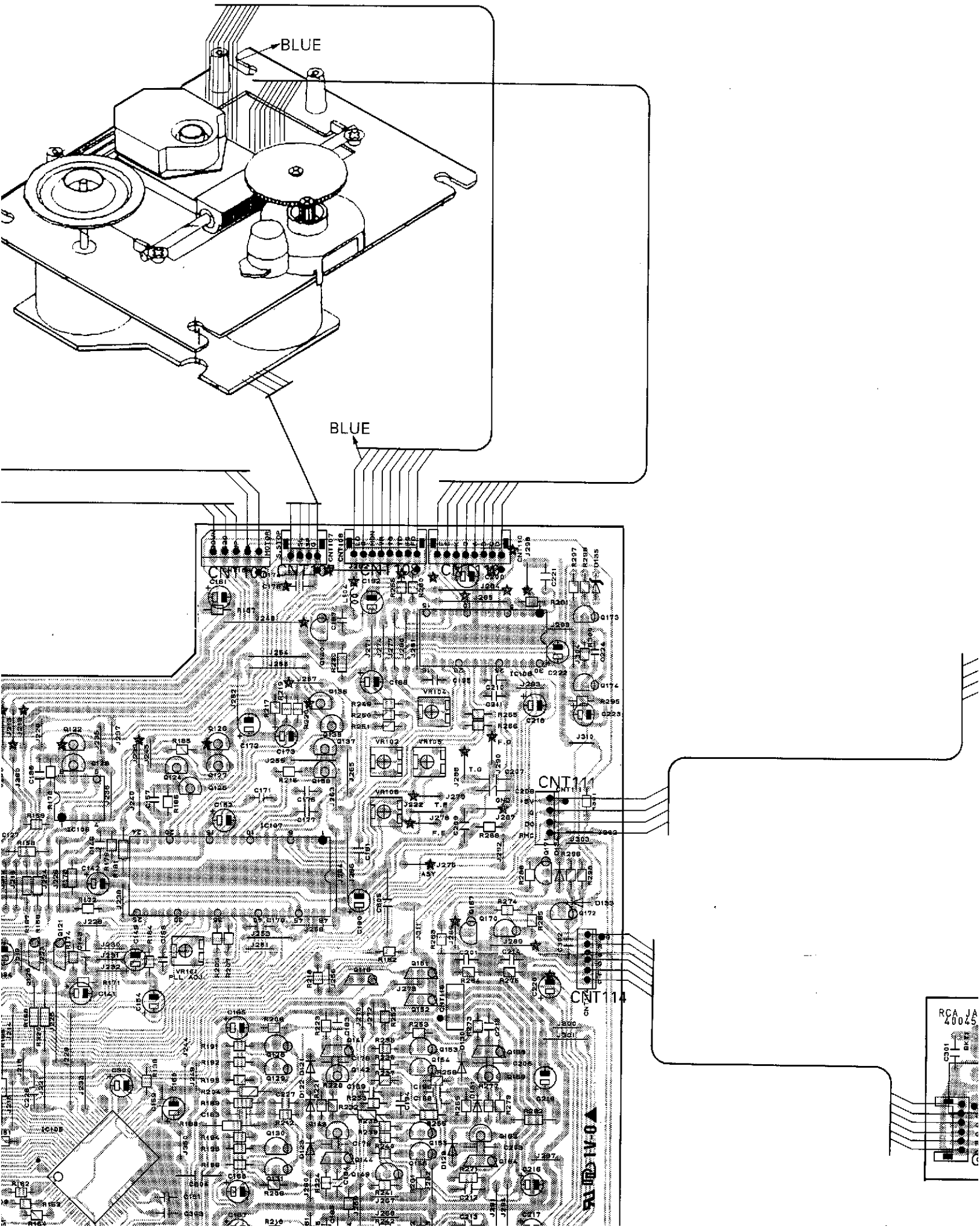

OPTICAL/DIGI B'D
4004500110
H/P B'D
4002522020
RMC B'D
4002522010
MINI JACK
IC110 LTV817
IC109 KIA4559S
IC114 KA7812
IC117 KA7912
IC118 KA7905
IC115 KA7805
CNT111
CNT111P
CNT112
CNT112P
CNT116
CNT115
CNT101
CNT102
CNT103
CNT103P
PLT102
RCA102
RMC1
S15
S16
S17
S18
S19
OUT
IN
A ONLY
R310 1
R311 1
R312 1(1W)
R126 2.2

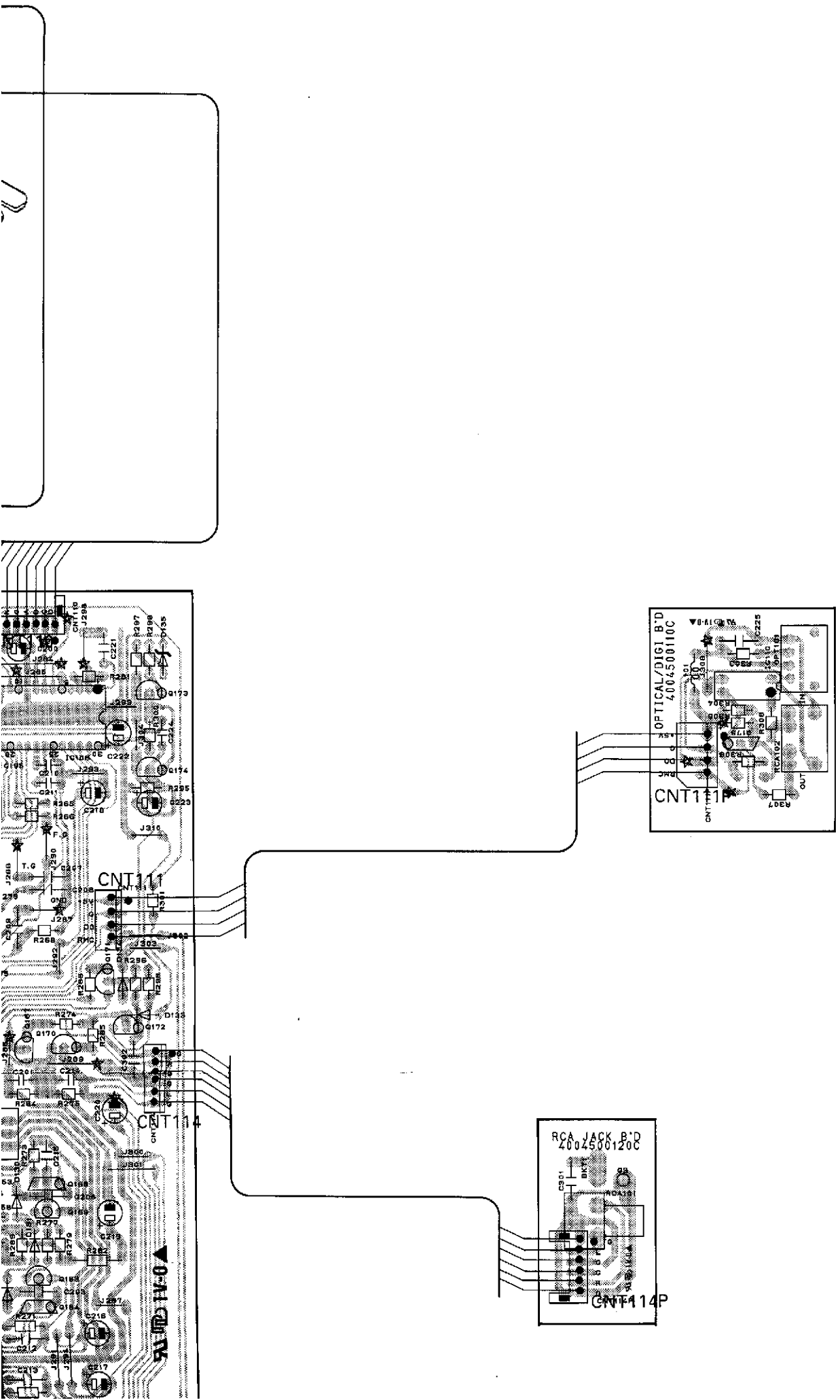

POWER SW B'D
4002522030
POWER TRANS
TRANS B'D
4005512200
RCA JACK B'D
4004500120
CNT114P
CNT101P
CNT102
CNT101
CNT114
CNT115
F101
LV101
AC INPUT | F101
120V/60Hz | SB350mA/125V
230V/50Hz | T 160mA/250V
1 | A
1
1| 1W |
2.2
ONLY

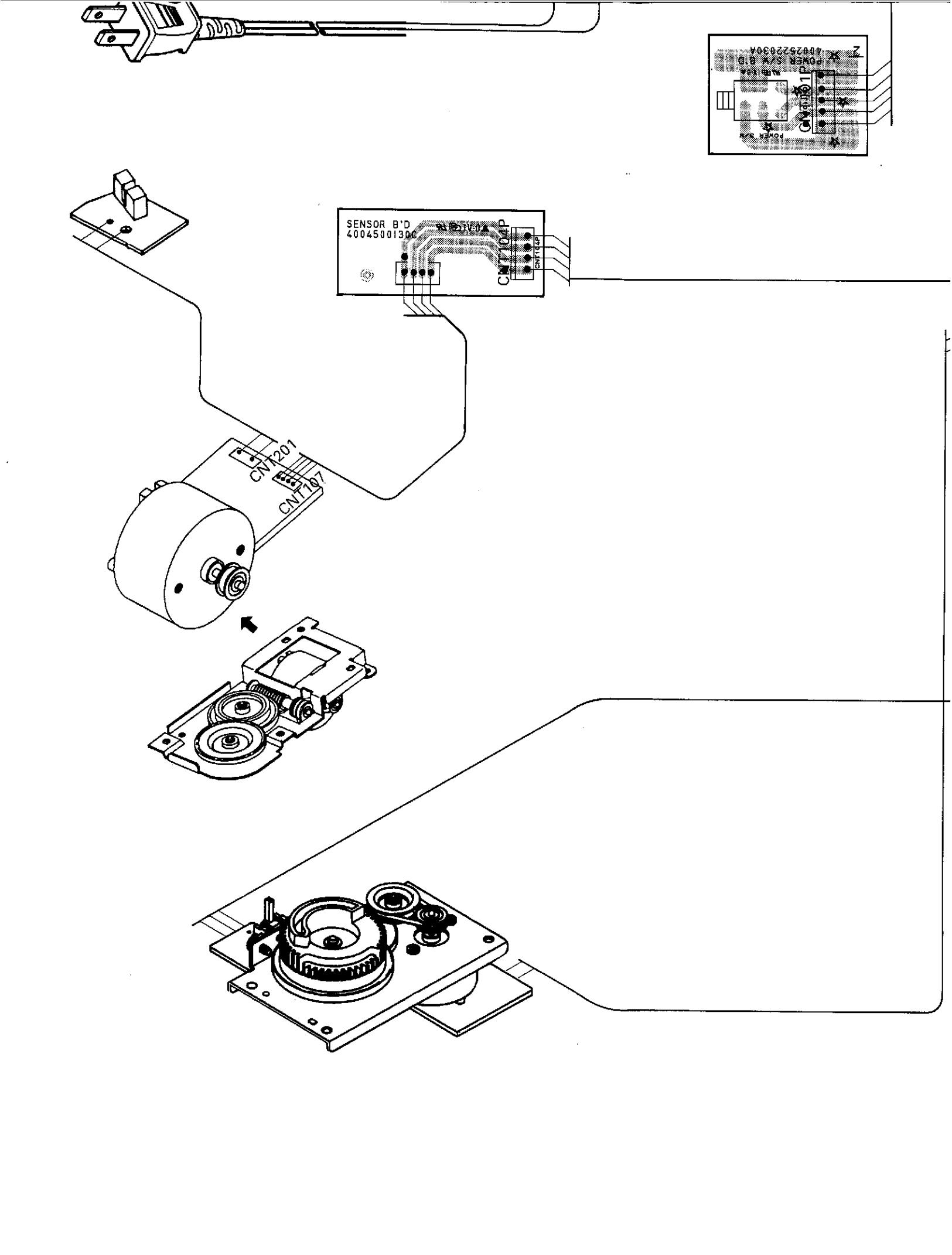
WIRING DIAGRAM

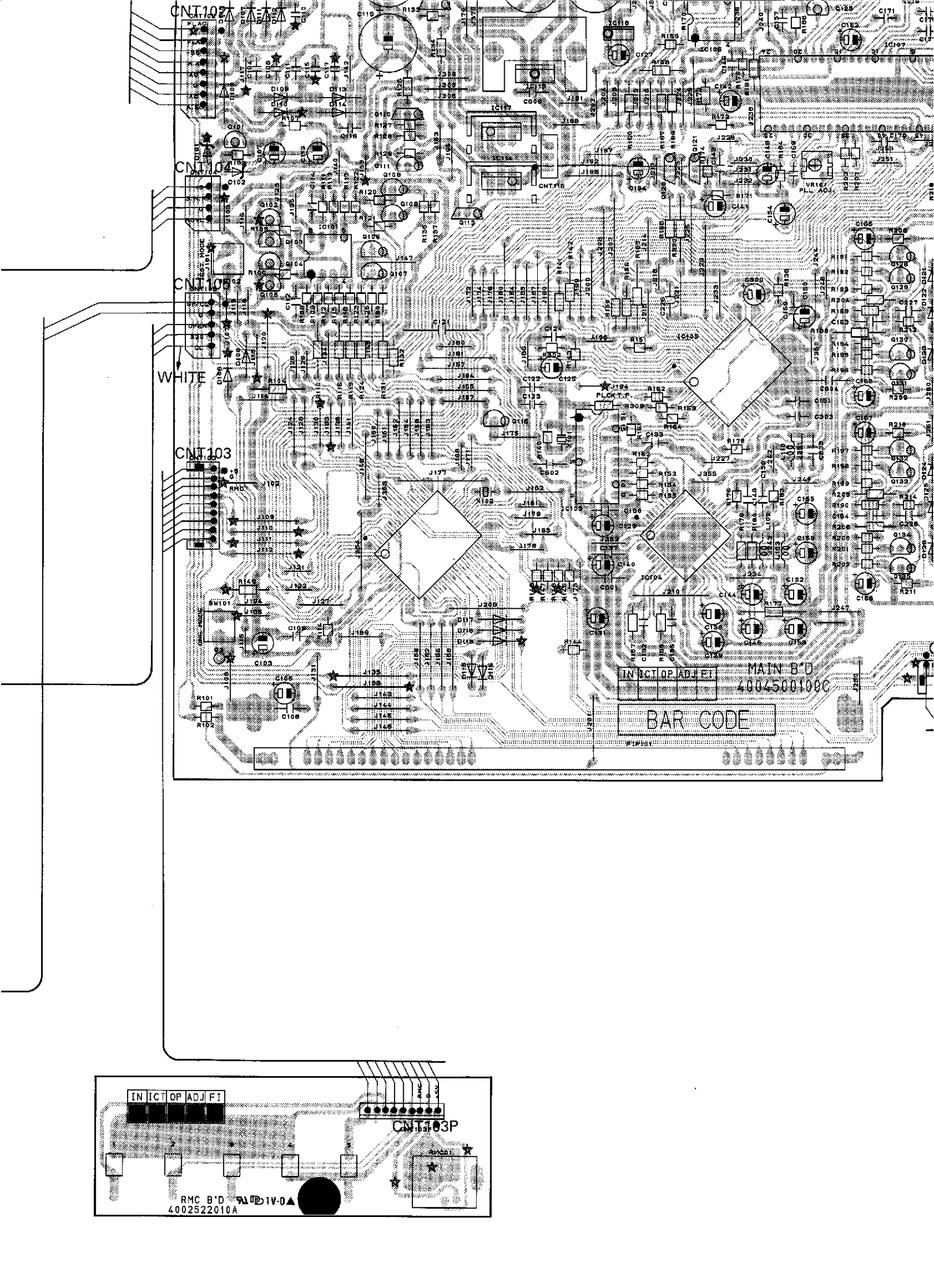


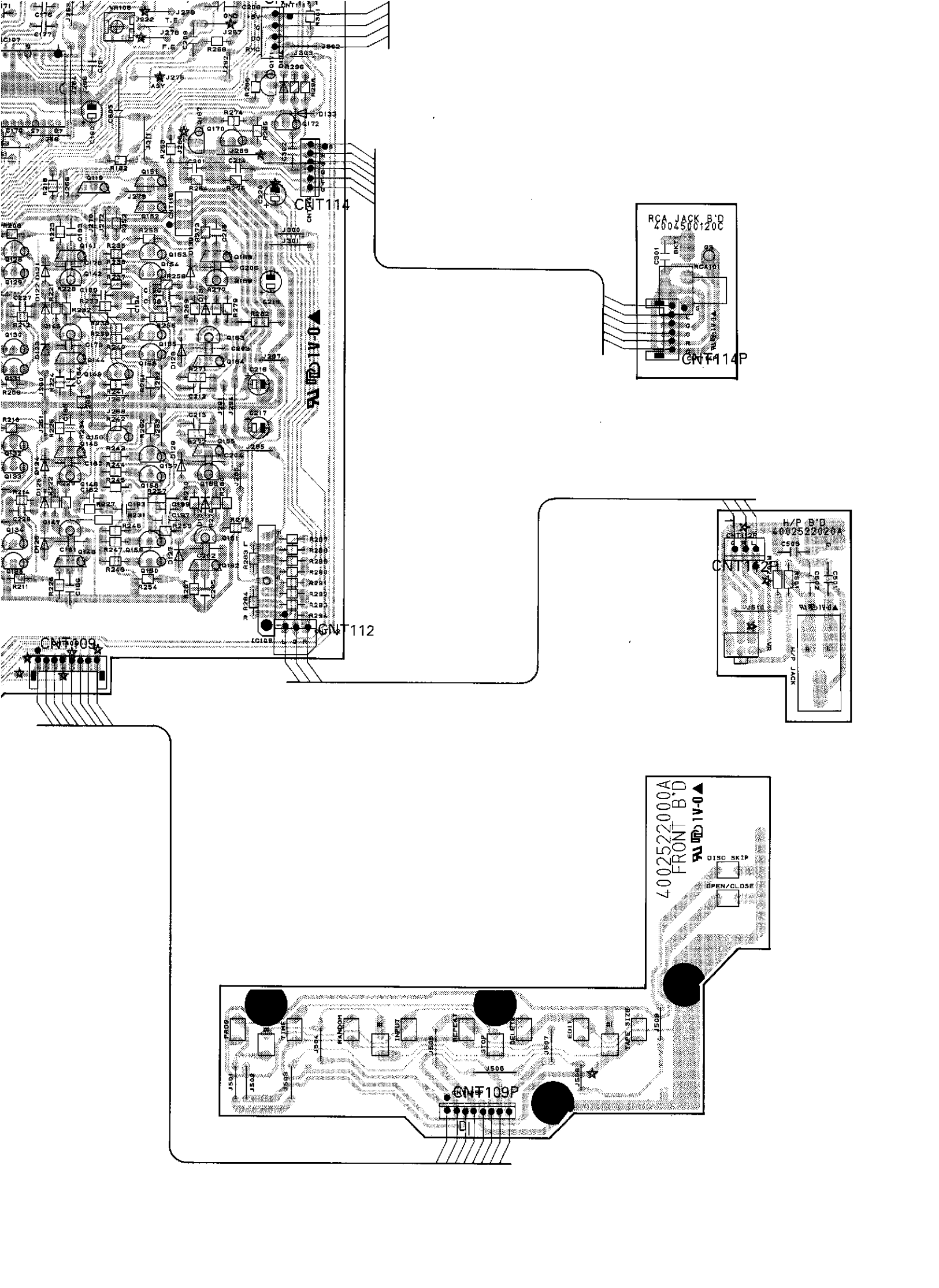

CNT101
CNT102
CNT104
CNT105
CNT103
WHITE


BLUE
BLUE
CNT106
CNT107
CNT108
CNT109
CNT110
CNT111
CNT114
CNT115
VR101
VR102
VR103
VR104
VR105
VR106
VR107
VR108
VR109
VR110
PLL ADJ
F.P
T.G
T.B
F.F
ASY
RHC
RCA JA
40045


OPTICAL/DIGI B'D
4004500110C
CNT111P
CNT111
CNT114
RCA JACK B'D
4004500120C
CNT114P


SENSOR B'D
CNT104P
CNT201
CNT107


CNT102
CNT104
CNT105
WHITE
CNT103
IN IC OP ADJ FI
MAIN B'D
4004500100C
BAR CODE
CNT103P
RMC B'D
4002522010A


CNT114
RCA JACK B'D
4004500120C
CNT114P
CNT112
CNT109
H/P B'D
4002522020A
CNT123
4002522000A
FRONT B'D
DISC SKIP
OPEN/CLOSE
CNT109P